

**FORTINET**



# Getting Started for FortiOS

VERSION 6.0.1

**FORTIOS  
VERSION  
6.0**

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June 05, 2018

FortiOS™ Handbook - Getting Started

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## Change Log

Date	Change Description
June 5, 2018	FortiOS 6.0.1 document release
June 4, 2018	Clarified Mobile Malware license information in the <a href="#">Dashboard</a> section
May 15, 2018	Corrected CLI command for configuring <a href="#">NGFW mode</a>
May 2, 2018	Removed redundant information on configuration revision and corrected information on <a href="#">FortiGuard</a> services
March 29, 2018	FortiOS 6.0 document release. See " <a href="#">What's new in FortiOS 6.0</a> " on page 8.

# Introduction

This guide explains how to get started with a FortiGate, and examines basic configuration tasks and best practices in these sections:

- [Installation](#) discusses installing a FortiGate in your network.
- [Using the GUI](#) highlights features of the graphical user interface (GUI).
- [Using the CLI](#) provides a high level overview of the command line interface (CLI) for FortiOS.
- [FortiExplorer for iOS](#) provides instructions for connecting to a FortiGate using the FortiExplorer for iOS app.
- [LED Specifications](#) presents a short guide to LED status indicators.
- [Inspection Mode](#) summarizes proxy-based and flow-based inspection modes.
- [Basic Administration](#) explains basic tasks for setting up a new FortiGate and for updating firmware.
- ["Troubleshooting your FortiGate Installation" on page 93](#) provides troubleshooting tips if your FortiGate installation is unsuccessful.
- [Resources](#) provides a list of documents to help you with more advanced FortiGate configurations.

## Differences between models

Before you get started, note that not all FortiGate models have the same features. This is especially true of the desktop or entry-level models: FortiGate / FortiWiFi models 30 to 90. If you are using one of these FortiGate models, you may have some difficulties accessing certain features.

The entry-level, or desktop, models can connect to the internet in two simple steps. They also have a number of features that are only available using the CLI, rather than appearing in the GUI.

- [Quick installation using DHCP](#)
- [CLI-only features](#)



Consult your model's Quick Start Guide, [hardware manual](#), or the [Feature / Platform Matrix](#) for further information about features that vary by model.

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The Fortinet Cookbook site has a section on [hardware](#) that provides how-to recipes and articles on features that are unique to certain models.

FortiGate models differ principally by the names used and the features available:

- Naming conventions may vary between FortiGate models. For example, on some models the hardware switch interface used for the local area network is called **lan**, while on other units it is called **internal**.
- Certain features are not available on all models. Additionally, a particular feature may be available only through the CLI on some models, while that same feature may be viewed in the GUI on other models.

If you believe your FortiGate model supports a feature that does not appear in the GUI, go to **System > Feature Visibility** and confirm that the feature is enabled. For more information, see [Feature Visibility on page 20](#).

## What's new in FortiOS 6.0

The following list contains new getting started features added in FortiOS 6.0. Click on a link to navigate to that section for further information.

- [New dashboard widget for "Botnet Activity" on page 19](#)
- [Dashboard widget improvements for "Administrators" on page 18](#)
- ["Modifying dashboard widget titles" on page 19](#)



# Installation

This section discusses how to install your FortiGate and use it in your network, after completion of the initial setup outlined in the FortiGate model's Quick Start Guide.

The following topics are included in this section:

- [Quick installation using DHCP](#)
- [Installing a FortiGate in NAT/Route mode](#)
- [Using a virtual wire pair](#)

## Quick installation using DHCP

Most of the FortiGate desktop models have a default configuration that includes a DHCP server on the **lan** (or **internal**) interface and a security policy that securely allows all sessions from the internal network to reach the Internet. Because of this, you can connect your desktop FortiGate to the Internet in two simple steps:



Note that, in order to use this installation method, your ISP must provide connectivity with DHCP and accept DHCP requests without authentication. You must also use IPv4 to connect your FortiGate to the Internet.

---

1. Connect the **wan** interface on your FortiGate to your ISP-supplied equipment, and connect the internal network to the default **lan** interface on your FortiGate. Turn on the ISP's equipment, the FortiGate, and the computers on the internal network.
2. For computers on the internal network:
  - a. **Windows Vista/7/8/10 users:**
    - i. Go to **Network and Sharing Center** and select **Change adapter settings**.
    - ii. Open the **Local Area Connection** (Ethernet or Wi-Fi, whichever applies) and select **Properties**.
    - iii. Select **Internet Protocol Version 4 (TCP/IPv4)** and then select **Properties**.
    - iv. Select **Obtain an IP address automatically** and **Obtain DNS server address automatically**.
    - v. Click **OK**.
  - b. **Mac OS X users:**
    - i. Go to **System Preferences > Network** and select your Ethernet connection.
    - ii. Set **Configure IPv4** to **Using DHCP**.

### Results

To confirm successful Internet connectivity from any computer on the internal network, open a web browser and browse to any website.

## Installing a FortiGate in NAT/route mode

There are two main ways to install a FortiGate using network address translation (NAT)/route mode: [Standard installation in NAT/route mode](#), where Internet access is provided by a single Internet service provider (ISP), and [Redundant Internet installation](#), where two ISPs are used.

### NAT/Route mode vs. transparent mode

A FortiGate can operate in one of two modes: NAT/route or transparent.

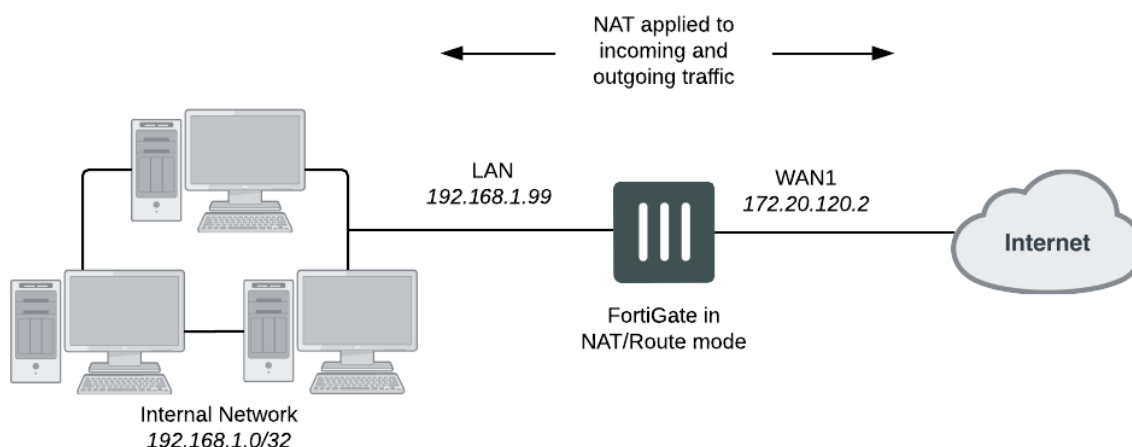
The most common of the two operating modes is NAT/route mode, where a FortiGate is installed as a gateway or router between two networks. In most cases, it is used between a private network and the Internet. This allows the FortiGate to hide the IP addresses of the private network using NAT. NAT/route mode is also used when two or more ISPs provide the FortiGate with redundant Internet connections.

A FortiGate in transparent mode is installed between the internal network and the router. In this mode, the FortiGate does not make any changes to IP addresses and only applies security scanning to traffic. When a FortiGate is added to a network in transparent mode, no network changes are required, except to provide the FortiGate with a management IP address. Transparent mode is used primarily when there is a need to increase network protection but changing the configuration of the network itself is impractical.

For more information about transparent mode, see the [Transparent Mode](#) handbook.

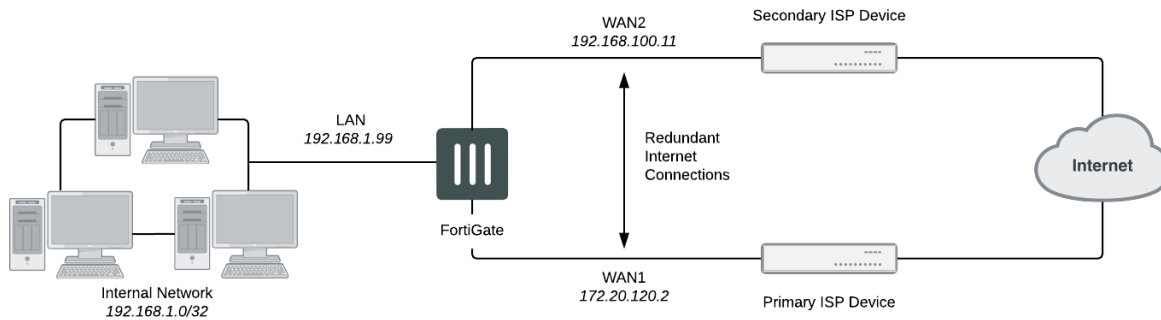
### Standard installation in NAT/route mode

In this configuration, a FortiGate is installed as a gateway or router between a private network and the Internet. By using NAT mode, the FortiGate is able to hide the IP addresses of the private network.



## Redundant Internet installation

In this configuration, a WAN link interface is created that provides the FortiGate with redundant Internet connections from two ISPs. The WAN link interface combines these two connections, allowing the FortiGate to treat them as a single interface.



### Installing a FortiGate with Redundant Internet



If you have previously configured your FortiGate using the standard installation, you will have to delete all routes and policies referring to an interface that will be used to provide redundant Internet. This includes the default Internet access policy that is included on many FortiGate models.

1. Connect your ISP devices to your FortiGate's Internet-facing interfaces (typically WAN1 and WAN2).
2. Go to **Network > SD-WAN** to create a WAN link interface, which is used to group multiple Internet connections together so that the FortiGate can treat them as a single interface.
3. Set the interface **Status** to **Enable**.
4. Under **SD-WAN Interface Members**, click on the plus sign and then on the down arrow to open the dropdown menu. Select WAN1 as the **Interface** and enter the **Gateway** IP provided by your primary ISP. Do the same for WAN2, but use the Gateway IP provided by your secondary ISP.
5. Select an appropriate method for the **SD-WAN Usage** from the following options, and **Apply** your changes when finished:
  - **Bandwidth** - A bandwidth cap is defined for active members of the SD WAN link.
  - **Volume** - A volume ratio is set for each active member.
  - **Sessions** - A sessions ratio is set for each active member.
6. Go to **Network > Static Routes** and create a new default route. Set **Interface** to the SD-WAN link.
7. Go to **Policy & Objects > IPv4 Policy** and select **Create New** to add a security policy that allows users on the private network to access the Internet.

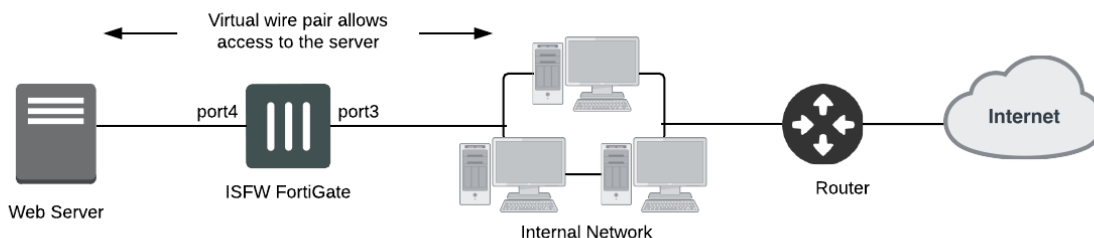
## Using a virtual wire pair

A virtual wire pair consists of two interfaces that do not have IP addressing and are treated similar to a transparent mode VDOM. All traffic received by one interface in the virtual wire pair can only be forwarded out the other interface, provided that a virtual wire pair firewall policy allows this traffic. Traffic from other interfaces cannot be routed to the interfaces in a virtual wire pair.

Virtual wire pairs are useful for atypical topologies where MAC addresses do not behave normally. For example, port pairing can be used in a Direct Server Return (DSR) topology where the response MAC address pair may not match the request's MAC address pair.

Virtual wire pairing replaces the port pairing feature available in earlier firmware versions. Unlike port pairing, virtual wire pairing can be used for FortiGates in both NAT/Route and Transparent modes.

In the example configuration below, a virtual wire pair (consisting of port3 and port4) makes it easier to protect a web server that is behind a FortiGate operating as an Internal Segmentation Firewall (ISFW). Users on the internal network will access the web server through the ISFW over the virtual wire pair.



### Adding a virtual wire pair and virtual wire pair policy



Interfaces used in a virtual wire pair cannot be used to access the ISFW FortiGate. Before creating a virtual wire pair, make sure you have a different port configured to allow admin access using your preferred protocol.

1. Go to **Network > Interfaces** and select **Create New > Virtual Wire Pair**.
2. Select the interfaces to add to the virtual wire pair. These interfaces cannot be part of a switch, such as the default **lan/internal** interface.
3. (Optional) If desired, enable **Wildcard VLAN**.
4. Select **OK**.
5. Go to **Policy & Objects > IPv4 Virtual Wire Pair Policy**, select the virtual wire pair, and select **Create New**.
6. Select the direction that traffic is allowed to flow.
7. Configure the other firewall options as desired.
8. Select **OK**.
9. If necessary, create a second virtual wire pair policy to allow traffic to flow in the opposite direction.



If you have a USB-wan interface, it will not be included in the interface list when building a wired-pair.

---

## Results

Traffic can now flow through the FortiGate using the virtual wire pair. For more information on this feature, see the [Networking](#) chapter.

# Using the GUI

This section presents an introduction to the graphical user interface (GUI) on your FortiGate, also called the web-based manager.

The following topics are included in this section:

- [Connecting to the GUI](#)
- [Menus](#)
- [Dashboard](#)
- [Feature Visibility](#)
- [Tables](#)
- [Text strings](#)

## Connecting to the GUI using a web browser



The graphical user interface is best displayed using a 1280 x 1024 resolution. Check the [FortiOS Release Notes](#) for information about browser compatibility.

---

In order to connect to the GUI using a web browser, an interface must be configured to allow administrative access over HTTPS or over both HTTPS and HTTP. By default, an interface has already been set up that allows HTTPS access, with the IP address 192.168.1.99.

Browse to <https://192.168.1.99> and enter your username and password. If you have not changed the admin account's password, use the default user name, `admin`, and leave the password field blank.

The GUI will now be displayed in your browser.

If you wish to use a different interface to access the GUI, do the following:

1. Go to **Network > Interfaces** and edit the interface you wish to use for access. Take note of its assigned IP address.
2. Beside **Administrative Access**, select **HTTPS**, and any other protocol you require. You can also select **HTTP**, although this is not recommended as the connection will be less secure.
3. Select **OK**.
4. Browse to the IP address using your chosen protocol.

### Results

The GUI will now be displayed in your browser.

## Menus



If you believe your FortiGate model supports a menu that does not appear in the GUI as expected, go to **System > Feature Visibility** and ensure the feature is enabled. For more information, see ["Feature Visibility" on page 1](#).

The GUI contains the following main menus, which provide access to configuration options for most FortiOS features:

<b>Dashboard</b>	<p>The dashboard displays various widgets that display important system information and allow you to configure some system options.</p> <p>For more information, see <a href="#">"Dashboard" on page 1</a>.</p>
<b>Security Fabric</b>	<p>Access the physical topology, logical topology, audit, and settings features of the Fortinet Security Fabric.</p> <p>For more information, see the <a href="#">Fortinet Security Fabric</a> handbook.</p>
<b>FortiView</b>	<p>A collection of dashboards and logs that give insight into network traffic, showing which users are creating the most traffic, what sort of traffic it is, when the traffic occurs, and what kind of threat the traffic may pose to the network.</p> <p>For more information, see the <a href="#">FortiView</a> handbook.</p>
<b>Network</b>	<p>Options for networking, including configuring system interfaces and routing options.</p> <p>For more information, see the <a href="#">Networking</a> handbook.</p>
<b>System</b>	<p>Configure system settings, such as administrators, FortiGuard, and certificates.</p> <p>For more information, see the <a href="#">System Administration</a> handbook.</p>
<b>Policy &amp; Objects</b>	<p>Configure firewall policies, protocol options, and supporting content for policies, including schedules, firewall addresses, and traffic shapers.</p> <p>For more information, see the <a href="#">Firewall</a> handbook.</p>
<b>Security Profiles</b>	<p>Configure your FortiGate's security features, including AntiVirus, Web Filtering, and Application Control.</p> <p>For more information, see the <a href="#">Security Profiles</a> handbook.</p>

<b>VPN</b>	<p>Configure options for IPsec and SSL virtual private networks (VPNs).</p> <p>For more information, see the <a href="#">IPsec VPN</a> and <a href="#">SSL VPN</a> handbooks.</p>
<b>User &amp; Device</b>	<p>Configure user accounts, groups, and authentication methods, including external authentication and single sign-on (SSO).</p>
<b>WiFi &amp; Switch Controller</b>	<p>Configure the unit to act as a wireless network controller, managing the wireless Access Point (AP) functionality of FortiWiFi and FortiAP units.</p> <p>On certain FortiGate models, this menu has additional features allowing for FortiSwitch units to be managed by the FortiGate.</p> <p>For more information, see the <a href="#">FortiWiFi and FortiAP Configuration Guide</a>.</p>
<b>Log &amp; Report</b>	<p>Configure logging and alert email as well as reports.</p> <p>For more information, see the <a href="#">Logging and Reporting</a> handbook.</p>
<b>Monitor</b>	<p>View a variety of monitors, including the Routing Monitor, VPN monitors for both IPsec and SSL, monitors relating to wireless networking, and more.</p>

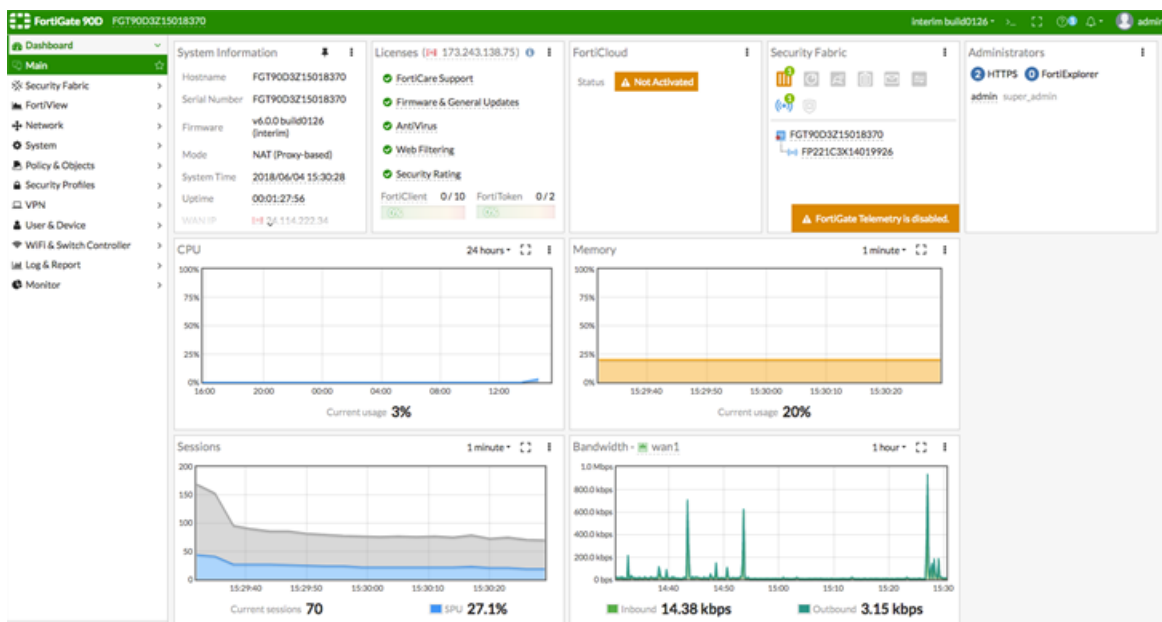


## Dashboard

The FortiOS **Dashboard** consists of a Network Operations Center (NOC) view with a focus on alerts. Widgets are interactive. By clicking or hovering over most widgets, the user can see additional information or follow links to other pages.

The dashboard and its widgets include:

- Multiple dashboard support
- VDOM and global dashboards
- Widget resize control
- Notifications on the top header bar



The following widgets are displayed by default:

Widget	Description
<b>System Information</b>	The <b>System Information</b> widget lists information relevant to the FortiGate system, including hostname, serial number, and firmware.
<b>Security Fabric</b>	The <b>Security Fabric</b> widget displays a visual summary of many of the devices in the Security Fabric. For more information, see the <a href="#">Security Fabric</a> handbook.
<b>CPU</b>	The real-time CPU usage is displayed for different timeframes.

Widget	Description
<b>Licenses</b>	<p>Hovering over the <b>Licenses</b> widget results in the display of status information (and, where applicable, database information) on the licenses for <b>FortiCare Support, Firmware &amp; General Updates, AntiVirus, Web Filtering, Security Rating, FortiClient</b>, and <b>FortiToken</b>. Note that Mobile Malware is not a separate service in FortiOS 6.0.0. The Mobile Malware subscription is included with the <b>AntiVirus</b> subscription.</p> <p>Clicking in the <b>Licenses</b> widget provides you with links to other pages, such as <b>System &gt; FortiGuard</b> or contract renewal pages.</p>
<b>FortiCloud</b>	This widget displays FortiCloud status and provides a link to activate FortiCloud.
<b>Administrators</b>	<p>This widget allows you to view:</p> <ul style="list-style-type: none"> <li>• which administrators are logged in and how many sessions are active (a link directs you to a page displaying active administrator sessions)</li> <li>• all connected administrators and the protocols used by each</li> </ul>
<b>Memory</b>	Real-time memory usage is displayed for different time frames. Hovering over any point on the graph displays percentage of memory used along with a timestamp.
<b>Sessions</b>	<p>Hovering over the <b>Sessions</b> widget allows you to view memory usage data over time. Click on the down arrow to change the timeframe displayed.</p> <p>Security processing unit, or <b>SPU</b>, percentage is displayed if your FortiGate includes an SPU. Likewise, <b>nTurbo</b> percentage is displayed if supported by your FortiGate. See the <a href="#">Hardware Acceleration</a> chapter for details.</p>
<b>Bandwidth</b>	<p>Hover over the <b>Bandwidth</b> widget to display bandwidth usage data over time. Click on the down arrow to change the timeframe displayed. Bandwidth is displayed for both incoming and outgoing traffic.</p>
<b>Virtual Machine</b>	<p>The VM widget (shown by default in the dashboard of a FortiOS VM device) includes:</p> <ul style="list-style-type: none"> <li>• License status and type</li> <li>• CPU allocation usage</li> <li>• License RAM usage</li> <li>• VMX license information (if the VM supports VMX)</li> </ul> <p>If the VM license specifies 'unlimited' the progress bar is blank. If the VM is in evaluation mode, it is yellow (warning style) and the dashboard shows the number of evaluation days used.</p>

The following optional widgets are also available:

- FortiView
- Host Scan Summary

- Vulnerabilities Summary
- Botnet Activity
- HA Status
- Log Rate
- Session Rate
- Security Fabric Score
- Advanced Threat Protection Statistics
- Interface Bandwidth

## Modifying dashboard widget titles

Dashboard widget titles can be modified so that widgets with different filters applied can be easily differentiated. The widget has a default title unless you set a new title.

### Syntax

```
config system admin
  edit <name>
    config gui-dashboard
      config widget
        edit 9
          set type fortiview
          ...
          set title "test source by bytes"
        end
      end
    end
  end
```

## Feature Visibility

**Feature Visibility** is used to control which features are visible in the GUI. This allows you to hide features that are not being used. Some features are also disabled by default and must be enabled in order to configure them through the GUI.

**Feature Visibility** only alters the visibility of these features, rather than their functionality. For example, disabling web filtering on the **Feature Visibility** page does not remove web filtering from the FortiGate, but removes the option of configuring web filtering from the GUI. Configuration options will still be available using the CLI.

### Enabling/disabling features

**Feature Visibility** can be found at **System > Feature Visibility**. Ensure that all features you wish to configure in the GUI are turned on, and that features you wish to hide are turned off. When you have finished, select **Apply**.

### Security Features presets

The main security features can be toggled individually, however six system presets (or **Feature Sets**) are available:

- **NGFW** should be chosen for networks that require application control and protection from external attacks.
- **ATP** should be chosen for networks that require protection from viruses and other external threats.
- **WF** should be chosen for networks that require web filtering.
- **NGFW + ATP** should be chosen for networks that require protection from external threats and attacks.
- **UTM** should be chosen for networks that require protection from external threats and wish to use security features that control network usage. This is the default setting.
- **Custom** should be chosen for networks that require customization of available features (including the ability to select all features).

## Tables

Many of the GUI pages contain tables of information that you can filter to display specific information. Administrators with read and write access can define the filters.

## Navigation

Some tables contain information and lists that span multiple pages. Navigation controls appear at the bottom of the page.

## Filters

Filters are used to locate a specific set of information or content within multiple pages. These are especially useful in locating specific log entries. The specific filtering options vary, depending on the type of information in the log.

To create a filter, select **Add Filter** at the top of the page. A list of the available fields for filtering will be shown.

## Column settings

Column settings are used to select the types of information displayed on a certain page. Some pages have large amounts of information available and not all content can be displayed on a single screen. Some pages may even contain content that is irrelevant to you. Using column settings, you can choose to display only relevant content.

To view configure column settings, right-click the header of a column and select the columns you wish to view and de-select any you wish to hide. After you have finished making your selections, click **Apply** (you may need to scroll down the list to do so).

Any changes that you make to the column settings are stored in the unit's configuration. To return columns to the default state for any given page, right-click any header and select **Reset Table**.

## Copying objects

In tables containing configuration objects, such as the policy table found at **Policy & Objects > IPv4 Policy**, you have the option to copy an object. This allows you to create a copy of that object, which you can then configure as needed. You can also reverse copy a policy to change the direction of the traffic impacted by that policy.

### To copy an object:

1. Select that object, then right-click to make a menu appear and select the **Copy** option.
2. Right-click the row in the table that is either above or below where you want the copied object to be placed, select the **Paste** option and indicate **Above** or **Below**.

Reverse cloning works much the same way. Instead of selecting **Copy**, select **Clone Reverse**.

Once the policy is copied, you must give it a name, configure as needed, and enable it.

## Editing objects

Some tables allow you to edit parts of the configuration directly on the table itself. For example, security features can be added to an existing firewall policy from the policy list by clicking on the plus sign in the **Security Profiles** column and selecting the desired profiles.

If this option is not immediately available, check to see that the column is not hidden (see [Column settings](#)). Otherwise, you must select the object and open the policy by selecting the **Edit** option found at the top of the page.

## Text Strings

The configuration of a FortiGate is stored in the FortiOS configuration database. To change the configuration, you can use the GUI or CLI to add, delete, or change configuration settings. These changes are stored in the database as you make them. Individual settings in the configuration database can be text strings, numeric values, selections from a list of allowed options, or on/off (enable/disable) settings.

### Entering text strings (names)

Text strings are used to name entities in the configuration. For example, the name of a firewall address, the name of an administrative user, and so on. You can enter any character in a FortiGate configuration text string, except the following characters that present cross-site scripting (XSS) vulnerabilities:

- “ (double quote)
- & (ampersand)
- ' (single quote)
- < (less than)
- > (greater than)

Most GUI text string fields make it easy to add an acceptable number of characters and prevent you from adding the XSS vulnerability characters.



There is a different character limitation for VDOM names and hostnames. The only valid characters are numbers (0-9), letters (a-z, A-Z), and special characters - (dash) and \_ (underscore).

You can also use the `tree` command in the CLI to view the number of characters allowed in a name field. For example, firewall address names can contain up to 64 characters. When you add a firewall address to the GUI, you are limited to entering 64 characters in the firewall address name field. From the CLI you can enter the following `tree` command to confirm that the firewall address `name` field allows 64 characters.

```
config firewall address
  tree
  -- [address] --*name (64)
  |- uuid
  |- subnet
  |- type
  |- start-ip
  |- end-ip
  |- fqdn (256)
  |- country (3)
  |- cache-ttl (0,86400)
  |- wildcard
  |- comment
  |- visibility
  |- associated-interface (36)
  |- color (0,32)
  |- [tags] --*name (65)
  +- allow-routing
```

The `tree` command output also shows the number of characters allowed for other firewall address name settings. For example, the fully qualified domain name (`fqdn`) field can contain up to 256 characters.

## Entering numeric values

Numeric values set various sizes, rates, addresses, and other numeric values (e.g. a static routing priority of 10, a port number of 8080, an IP address of 10.10.10.1). Numeric values can be entered as a series of digits without spaces or commas (for example, 10 or 64400), in dotted decimal format (for example the IP address 10.10.10.1) or, as in the case of MAC or IPv6 addresses, separated by colons (e.g. the MAC address 00:09:0F:B7:37:00). Most numeric values are standard base 10 numbers, but some fields, such as MAC addresses, require hexadecimal numbers.

Most GUI numeric value fields make it easy to add the acceptable number of digits within the allowed range. CLI help text includes information about allowed numeric value ranges. Both the GUI and the CLI prevent you from entering invalid numbers.



# Using the CLI

The command line interface (CLI) is an alternative configuration tool to the GUI or web-based manager. While the configuration of the GUI uses a point-and-click method, the CLI requires typing commands or uploading batches of commands from a text file, like a configuration script.

This section explains common CLI tasks that an administrator performs on a regular basis and includes the topics:

- [Connecting to the CLI](#)
- [Command syntax](#)
- [Sub-commands](#)
- [Permissions](#)
- [Tips](#)

## Connecting to the CLI

You can access the CLI in three ways:

- [Locally with a console cable](#) — Connect your computer directly to the console port of your FortiGate. Local access is required in some cases:
  - If you are installing your FortiGate for the first time and it is not yet configured to connect to your network, you may only be able to connect to the CLI using a local serial console connection, unless you reconfigure your computer's network settings for a peer connection.
  - Restoring the firmware utilizes a boot interrupt. Network access to the CLI is not available until after the boot process has completed, making local CLI access the only viable option.
- [Through the network](#) — Connect your computer through any network interface attached to one of the network ports on your FortiGate. The network interface must have enabled Telnet or SSH administrative access if you connect using an SSH/Telnet client, or HTTP/HTTPS administrative access if you connect by accessing the **CLI Console** in the GUI. The CLI console can be accessed from the upper-right hand corner of the screen and appears as a slide-out window.
- [Locally with FortiExplorer for iOS](#) — Use the FortiExplorer app on your iOS device to configure, manage, and monitor your FortiGate.

## Connecting to the CLI using a local console

Local console connections to the CLI are formed by directly connecting your management computer or console to the FortiGate unit, using its DB-9 or RJ-45 console port. To connect to the local console you need:

- A computer with an available serial communications (COM) port.
- The RJ-45-to-DB-9 or null modem cable included in your FortiGate package.
- Terminal emulation software such as HyperTerminal for Microsoft Windows.

The following procedure describes the connection using Microsoft HyperTerminal software; steps may vary with other terminal emulators.

**To connect to the CLI using a local serial console connection**

1. Using the null modem or RJ-45-to-DB-9 cable, connect the FortiGate unit's console port to the serial communications (COM) port on your management computer.
2. On your management computer, start HyperTerminal.
3. For the **Connection Description**, enter a **Name** for the connection, and select **OK**.
4. On the **Connect using** drop-down, select the communications (COM) port on your management computer you are using to connect to the FortiGate unit.
5. Select **OK**.
6. Select the following **Port** settings and select **OK**.

<b>Bits per second</b>	9600
<b>Data bits</b>	8
<b>Parity</b>	None
<b>Stop bits</b>	1
<b>Flow control</b>	None

7. Press **Enter** or **Return** on your keyboard to connect to the CLI.
8. Type a valid administrator account name (such as `admin`) and press **Enter**.
9. Type the password for that administrator account and press **Enter**. (In its default state, there is no password for the `admin` account.)

The CLI displays the following text:

```
Welcome!
Type ? to list available commands.
```

You can now enter CLI commands, including configuring access to the CLI through SSH or Telnet.

**Enabling access to the CLI through the network (SSH or Telnet)**

SSH or Telnet access to the CLI is accomplished by connecting your computer to the FortiGate unit using one of its RJ-45 network ports. You can either connect directly, using a peer connection between the two, or through any intermediary network.



If you do not want to use an SSH/Telnet client and you have access to the web-based manager, you can alternatively access the CLI through the network using the **CLI Console** widget in the web-based manager.

You must enable SSH and/or Telnet on the network interface associated with that physical network port. If your computer is not connected directly or through a switch, you must also configure the FortiGate unit with a static route to a router that can forward packets from the FortiGate unit to your computer. You can do this using either a local console connection or the web-based manager.

**Requirements**

- A computer with an available serial communications (COM) port and RJ-45 port
- Terminal emulation software such as HyperTerminal for Microsoft Windows

- The RJ-45-to-DB-9 or null modem cable included in your FortiGate package
- A network cable
- Prior configuration of the operating mode, network interface, and static route.

### To enable SSH or Telnet access to the CLI using a local console connection

1. Using the network cable, connect the FortiGate unit's network port either directly to your computer's network port, or to a network through which your computer can reach the FortiGate unit.
2. Note the number of the physical network port.
3. Using a local console connection, connect and log into the CLI.
4. Enter the following command:

```
config system interface
  edit <interface_str>
    set allowaccess <protocols_list>
  end
```

where:

- <interface\_str> is the name of the network interface associated with the physical network port and containing its number, such as `port1`.
- <protocols\_list> is the complete, space-delimited list of permitted administrative access protocols, such as `https ssh telnet`.

For example, to exclude HTTP, HTTPS, SNMP, and PING, and allow only SSH and Telnet administrative access on `port1`, enter the following:

```
config system interface
  edit port1
    set allowaccess ssh telnet
  end
```

5. To confirm the configuration, enter the command to display the network interface's settings.

```
show system interface <interface_str>
```

The CLI displays the settings, including the allowed administrative access protocols, for the network interfaces.

## Connecting to the CLI using SSH

Once the FortiGate unit is configured to accept SSH connections, you can use an SSH client on your management computer to connect to the CLI.

Secure Shell (SSH) provides both secure authentication and secure communications to the CLI. FortiGate units support 3DES and Blowfish encryption algorithms for SSH.

Before you can connect to the CLI using SSH, you must first configure a network interface to accept SSH connections. The following procedure uses PuTTY. Steps may vary with other SSH clients.

### To connect to the CLI using SSH

1. On your management computer, start an SSH client.
2. In **Host Name (or IP address)**, enter the IP address of a network interface on which you have enabled SSH administrative access.
3. Set a **Port** of 22.

4. For the **Connection type**, select **SSH**.

5. Select **Open**.

The SSH client connects to the FortiGate unit.

The SSH client may display a warning if this is the first time you are connecting to the FortiGate unit and its SSH key is not yet recognized by your SSH client, or if you have previously connected to the FortiGate unit but used a different IP address or SSH key. This is normal if your management computer is directly connected to the FortiGate unit with no network hosts between them.

6. Click **Yes** to verify the fingerprint and accept the FortiGate unit's SSH key. You will not be able to log in until you have accepted the key.
7. The CLI displays a login prompt.
8. Type a valid administrator account name (such as `admin`) and press **Enter**.
9. Type the password for this administrator account and press **Enter**.

The FortiGate unit displays a command prompt (its hostname followed by a #). You can now enter CLI commands.



If three incorrect login or password attempts occur in a row, you will be disconnected. If this occurs, wait one minute, then reconnect to attempt the login again.

---

## Connecting to the CLI using Telnet

Once the FortiGate unit is configured to accept Telnet connections, you can use a Telnet client on your management computer to connect to the CLI.



Telnet is not a secure access method. SSH should be used to access the CLI from the Internet or any other untrusted network.

---

Before you can connect to the CLI using Telnet, you must first configure a network interface to accept Telnet connections.

### To connect to the CLI using Telnet

1. On your management computer, start a Telnet client.
2. Connect to a FortiGate network interface on which you have enabled Telnet.
3. Type a valid administrator account name (such as `admin`) and press **Enter**.
4. Type the password for this administrator account and press **Enter**.

The FortiGate unit displays a command prompt (its hostname followed by a #). You can now enter CLI commands.



If three incorrect login or password attempts occur in a row, you will be disconnected. If this occurs, wait one minute, then reconnect to attempt the login again.

---

## CLI-only features

As you can see in the [Feature / Platform Matrix](#), the entry level models have a number of features that are only available using the CLI, rather than appearing in the GUI.

You can open the CLI console so that it automatically opens to the object you wish to configure. For example, to edit a firewall policy, right-click on the policy in the policy list (**Policy & Objects > IPv4 Policy**) and select **Edit in CLI**. The CLI console will appear, with the commands to access this part of the configuration added automatically.

Once you have access to the CLI, you can enter instructions for specific tasks that can be found throughout the FortiOS Handbook. Options are also available at the top of the CLI Console to **Clear console**, **Download**, and **Copy to clipboard**.

Refer to the [CLI Reference](#) for a list of the available commands.

## Command syntax

When entering a command, the CLI console requires that you use valid syntax and conform to expected input constraints. It will reject invalid commands.

Fortinet documentation uses the conventions below to describe valid command syntax.

## Terminology

Each command line consists of a command word that is usually followed by configuration data or other specific item that the command uses or affects.

To describe the function of each word in the command line, especially if that nature has changed between firmware versions, Fortinet uses terms with the following definitions.

### Command syntax terminology

- **Command** — A word that begins the command line and indicates an action that the FortiGate should perform on a part of the configuration or host on the network, such as `config` or `execute`. Together with other words, such as fields or values, that end when you press the **Enter** key, it forms a command line. Exceptions include multi-line command lines, which can be entered using an escape sequence.  
Valid command lines must be unambiguous if abbreviated. Optional words or other command line permutations are indicated by syntax notation.
- **Sub-command** — A `config` sub-command that is available only when nested within the scope of another command. After entering a command, its applicable sub-commands are available to you until you exit the scope of the command, or until you descend an additional level into another sub-command. Indentation is used to indicate levels of nested commands.  
Not all top-level commands have sub-commands. Available sub-commands vary by their containing scope.
- **Object** — A part of the configuration that contains tables and /or fields. Valid command lines must be specific enough to indicate an individual object.
- **Table** — A set of fields that is one of possibly multiple similar sets which each have a name or number, such as an administrator account, policy, or network interface. These named or numbered sets are sometimes referenced by other parts of the configuration that use them.
- **Field** — The name of a setting, such as `ip` or `hostname`. Fields in some tables must be configured with values. Failure to configure a required field will result in an invalid object configuration error message, and the FortiGate will discard the invalid table.
- **Value** — A number, letter, IP address, or other type of input that is usually your configuration setting held by a field. Some commands, however, require multiple input values which may not be named but are simply entered in sequential order in the same command line. Valid input types are indicated by constraint notation.
- **Option** — A kind of value that must be one or more words from of a fixed set of options.

## Indentation

Indentation indicates levels of nested commands, which indicate what other sub-commands are available from within the scope. The “`next`” and “`end`” lines are used to maintain a hierarchy and flow to CLI commands, especially helping to distinguish those commands with extensive sub-commands.

The "next" line is entered at the same indentation-level as the previous "edit", to mark where you would like to finish that table entry and move on to the next table entry; doing so will not mean that you have "left" that sub-command.

## next

Below is an example command, with a sub-command of `entries`:

```
config dlp filepattern
  edit <1>
    set name <name>
    set comment [comment]
    config entries
      edit <2>
        set filter-type {pattern | type}
      next
    ←
```

After entering settings for <2> and entering `next`, the <2> table entry has been saved, and you be set back one level of indentation so you can continue to create more `entries` (if you wish).

This hierarchy is best indicated in the CLI console, as the example below is what displays in the console after entering `next`:

```
FGT60E1Q23456789 (entries) #
```



To go-back up an indentation-level from this point on (i.e. to finish configuring the `entries` sub-command), you **cannot** enter `next`; you must enter `end`.

## end

Below is the same command and sub-command, except `end` has been entered instead of `next` after the sub-command:

```

config dlp filepattern
edit <1>
    set name <name>
    set comment [comment]
    config entries
        edit <2>
            set filter-type {pattern | type}
        end
    end
  ←

```

Entering `end` will save the <2> table entry, but bring you out of the sub-command entirely; in this example, you would enter this when you don't wish to continue creating new `entries`.

Again, your hierarchy is best indicated by the CLI console. Below is what displays in the console after entering `end`:

```
FGT60E1Q23456789 (1) #
```

## Notation

Brackets, braces, and pipes are used to denote valid permutations of the syntax. Constraint notations, such as `<address_ipv4>`, indicate which data types or string patterns are acceptable value input.

All syntax uses the following conventions:

Convention	Description
<b>Square brackets</b> [ ]	<p>An optional word or series of words. For example:</p> <pre>[verbose {1   2   3}]</pre> <p>indicates that you may either omit or type both the word <code>verbose</code> and its accompanying option/s, such as <code>verbose 3</code>.</p> <p>See <a href="#">Optional values and ranges</a> below for more information.</p>
<b>Curly braces</b> { }	<p>A word or series of words that is constrained to a set of options delimited by either vertical bars or spaces. You must enter at least one of the options, unless the set of options is surrounded by square brackets [ ].</p>
<b>Mutually exclusive options - delimited by vertical bars</b>	<p>Both mutually and non-mutually exclusive commands will use curly braces, as they provide multiple options, however mutually exclusive commands will divide each option with a pipe. This indicates that you are permitted to enter one option <b>or</b> the other:</p> <pre>{enable   disable}</pre>



Convention	Description
<b>Non-mutually exclusive options - delimited by spaces</b>	<p>Non-mutually exclusive commands do not use pipes to divide their options. In those circumstances, multiple options can be entered at once, as long as they are entered with a space separating each option:</p> <pre>{http https ping snmp ssh telnet}</pre>
<b>Angle brackets &lt; &gt;</b>	<p>A word constrained by data type. The angled brackets contain a descriptive name followed by an underscore ( _ ) and suffix that indicates the valid data type. For example, <code>&lt;retries_int&gt;</code>, indicates that you should enter a number of retries as an integer.</p> <p>Data types include:</p> <ul style="list-style-type: none"> <li>• <code>&lt;xxx_name&gt;</code>: A name referring to another part of the configuration, such as <code>policy_A</code>.</li> <li>• <code>&lt;xxx_index&gt;</code>: An index number referring to another part of the configuration, such as <code>0</code> for the first static route.</li> <li>• <code>&lt;xxx_pattern&gt;</code>: A regular expression or word with wild cards that matches possible variations, such as <code>*@example.com</code> to match all email addresses ending in <code>@example.com</code>.</li> <li>• <code>&lt;xxx_fqdn&gt;</code>: A fully qualified domain name (FQDN), such as <code>mail.example.com</code>.</li> <li>• <code>&lt;xxx_email&gt;</code>: An email address, such as <code>admin@example.com</code>.</li> <li>• <code>&lt;xxx_ipv4&gt;</code>: An IPv4 address, such as <code>192.168.1.99</code>.</li> <li>• <code>&lt;xxx_v4mask&gt;</code>: A dotted decimal IPv4 netmask, such as <code>255.255.255.0</code>.</li> <li>• <code>&lt;xxx_ipv4mask&gt;</code>: A dotted decimal IPv4 address and netmask separated by a space, such as <code>192.168.1.99 255.255.255.0</code>.</li> <li>• <code>&lt;xxx_ipv4/mask&gt;</code>: A dotted decimal IPv4 address and CIDR-notation netmask separated by a slash, such as <code>192.168.1.1/24</code></li> <li>• <code>&lt;xxx_ipv4range&gt;</code> : A hyphen ( - )-delimited inclusive range of IPv4 addresses, such as <code>192.168.1.1-192.168.1.255</code>.</li> <li>• <code>&lt;xxx_ipv6&gt;</code>: A colon ( : )-delimited hexadecimal IPv6 address, such as <code>3f2e:6a8b:78a3:0d82:1725:6a2f:0370:6234</code>.</li> <li>• <code>&lt;xxx_v6mask&gt;</code>: An IPv6 netmask, such as <code>/96</code>.</li> <li>• <code>&lt;xxx_ipv6mask&gt;</code>: A dotted decimal IPv6 address and netmask separated by a space.</li> <li>• <code>&lt;xxx_str&gt;</code>: A string of characters that is not another data type, such as <code>P@ssw0rd</code>. Strings containing spaces or special characters must be surrounded in quotes or use escape sequences.</li> <li>• <code>&lt;xxx_int&gt;</code>: An integer number that represents a metric, <code>minutes_int</code> for the number of minutes.</li> </ul>

## Optional values and ranges

Any field that is optional will use square-brackets, such as `set comment`. This is because it doesn't matter whether it's set or not. The overall config command will still successfully be taken.

Another example of where square-brackets would be used is to show that multiple options can be set, even intermixed with ranges. The example below shows a field that can be set to either a specific value or range, or multiple instances:

```
config firewall service custom
  set iprange <range1> [<range2> <range3> ...]
end
```

## Sub-commands

Each command line consists of a command word that is usually followed by configuration data or other specific item that the command uses or affects:

```
get system admin
```

Sub-commands are available from within the scope of some commands. When you enter a sub-command level, the command prompt changes to indicate the name of the current command scope. For example, after entering:

```
config system admin
```

the command prompt becomes:

```
(admin) #
```

Applicable sub-commands are available to you until you exit the scope of the command, or until you descend an additional level into another sub-command.

For example, the `edit` sub-command is available only within a command that affects tables; the `next` sub-command is available only from within the `edit` sub-command:

```
config system interface
  edit port1
    set status up
  next
end
```

Sub-command scope is indicated by indentation.

Available sub-commands vary by command. From a command prompt within `config`, two types of sub-commands might become available:

- commands affecting fields
- commands affecting tables

## Commands for tables

### clone <table>

Clone (or make a copy of) a table from the current object.

For example, in `config firewall policy`, you could enter the following command to clone security policy 27 to create security policy 30:

```
clone 27 to 30
```

In `config antivirus profile`, you could enter the following command to clone an antivirus profile named `av_pro_1` to create a new antivirus profile named `av_pro_2`:

```
clone av_pro_1 to av_pro_2
```

`clone` may not be available for all tables.

### delete <table>

Remove a table from the current object.

For example, in `config system admin`, you could delete an administrator account named `newadmin` by typing `delete newadmin` and pressing Enter. This deletes `newadmin` and all its fields, such as `newadmin's` first-name and email-address.

`delete` is only available within objects containing tables.

### edit <table>

Create or edit a table in the current object.

For example, in `config system admin`:

- edit the settings for the default `admin` administrator account by typing `edit admin`.
- add a new administrator account with the name `newadmin` and edit `newadmin's` settings by typing `edit newadmin`.

`edit` is an interactive sub-command: further sub-commands are available from within `edit`.

`edit` changes the prompt to reflect the table you are currently editing.

`edit` is only available within objects containing tables.

In objects such as security policies, `<table>` is a sequence number. To create a new entry without the risk of overwriting an existing one, enter `edit 0`. The CLI initially confirms the creation of entry 0, but assigns the next unused number after you finish editing and enter `end`.

### end

Save the changes to the current object and exit the `config` command. This returns you to the top-level command prompt.

<b>get</b>	<p>List the configuration of the current object or table.</p> <ul style="list-style-type: none"> <li>• In objects, <code>get</code> lists the table names (if present), or fields and their values.</li> <li>• In a table, <code>get</code> lists the fields and their values.</li> </ul> <p>For more information on <code>get</code> commands, see the <a href="#">CLI Reference</a>.</p>
<b>purge</b>	<p>Remove all tables in the current object.</p> <p>For example, in <code>config user local</code>, you could type <code>get</code> to see the list of user names, then type <code>purge</code> and then <code>y</code> to confirm that you want to delete all users.</p> <p><code>purge</code> is only available for objects containing tables.</p> <p><b>Caution:</b> Back up the FortiGate before performing a <code>purge</code>. <code>purge</code> cannot be undone. To restore purged tables, the configuration must be restored from a backup.</p> <p><b>Caution:</b> Do not purge <code>system interface</code> or <code>system admin</code> tables. <code>purge</code> does not provide default tables. This can result in being unable to connect or log in, requiring the FortiGate to be formatted and restored.</p>
<b>rename &lt;table&gt; to &lt;table&gt;</b>	<p>Rename a table.</p> <p>For example, in <code>config system admin</code>, you could rename <code>admin3</code> to <code>fwadmin</code> by typing <code>rename admin3 to fwadmin</code>.</p> <p><code>rename</code> is only available within objects containing tables.</p>
<b>show</b>	<p>Display changes to the default configuration. Changes are listed in the form of configuration commands.</p>

## Example of table commands

From within the `system admin` object, you might enter:

```
edit admin_1
```

The CLI acknowledges the new table, and changes the command prompt to show that you are now within the `admin_1` table:

```
new entry 'admin_1' added
(admin_1) #
```

## Commands for fields

<b>abort</b>	Exit both the <code>edit</code> and/or <code>config</code> commands without saving the fields.
--------------	--

<b>append</b>	Add an option to an existing list.
<b>end</b>	Save the changes made to the current table or object fields, and exit the <code>config</code> command (to exit without saving, use <code>abort</code> instead).
<b>get</b>	<p>List the configuration of the current object or table.</p> <ul style="list-style-type: none"> <li>• In objects, <code>get</code> lists the table names (if present), or fields and their values.</li> <li>• In a table, <code>get</code> lists the fields and their values.</li> </ul>
<b>move</b>	Move an object within a list, when list order is important. For example, rearranging security policies within the policy list.
<b>next</b>	<p>Save the changes you have made in the current table's fields, and exit the <code>edit</code> command to the object prompt (to save and exit completely to the root prompt, use <code>end</code> instead).</p> <p><code>next</code> is useful when you want to create or edit several tables in the same object, without leaving and re-entering the <code>config</code> command each time.</p> <p><code>next</code> is only available from a table prompt; it is not available from an object prompt.</p>
<b>select</b>	<p>Clear all options except for those specified.</p> <p>For example, if a group contains members A, B, C, and D and you remove all users except for B, use the command <code>select member B</code>.</p>
<b>set &lt;field&gt; &lt;value&gt;</b>	<p>Set a field's value.</p> <p>For example, in <code>config system admin</code>, after typing <code>edit admin</code>, you could type <code>set password newpass</code> to change the password of the <code>admin</code> administrator to <code>newpass</code>.</p> <p><b>Note:</b> When using <code>set</code> to change a field containing a space-delimited list, type the whole new list. For example, <code>set &lt;field&gt; &lt;new-value&gt;</code> will replace the list with the <code>&lt;new-value&gt;</code> rather than appending <code>&lt;new-value&gt;</code> to the list.</p>
<b>show</b>	Display changes to the default configuration. Changes are listed in the form of configuration commands.
<b>unselect</b>	Remove an option from an existing list.
<b>unset &lt;field&gt;</b>	<p>Reset the table or object's fields to default values.</p> <p>For example, in <code>config system admin</code>, after typing <code>edit admin</code>, typing <code>unset password</code> resets the password of the <code>admin</code> administrator account to the default (in this case, no password).</p>

### Example of field commands

To assign the value `my1stExamplePassword` to the `password` field, enter the following command from within the `admin_1` table:

```
set password my1stExamplePassword
```

Next, to save the changes and edit the next administrator's table, enter the `next` command.

## Permissions

Access profiles control which CLI commands an administrator account can access. Access profiles assign either read, write, or no access to each area of FortiOS. To view configurations, you must have read access. To make changes, you must have write access. So, depending on the account used to log in to the FortiGate unit, you may not have complete access to all CLI commands. For complete access to all commands, you must log in with the administrator account named `admin`.

Unlike other administrator accounts, the `admin` account exists by default and cannot be deleted. The `admin` account is similar to a root administrator account that always has full permission to view and change all FortiGate configuration options, including viewing and changing all other administrator accounts. Its name and permissions cannot be changed. It is the only administrator account that can reset another administrator's password without being required to enter that administrator's existing password.



Set a strong password for the `admin` account, and change the password regularly. By default, this administrator account has no password. Failure to maintain the password of the `admin` account could compromise the security of your FortiGate.

---



## Tips

Basic features and characteristics of the CLI environment provide support and ease of use for many CLI tasks.

## Help

To display brief help during command entry, press the question mark (?) key.

- Press the question mark (?) key at the command prompt to display a list of the commands available and a description of each command.
- Type a word or part of a word, then press the question mark (?) key to display a list of valid word completions or subsequent words, and to display a description of each.

## Shortcuts and key commands

Keys	Action
?	List valid word completions or subsequent words.  If multiple words could complete your entry, display all possible completions with helpful descriptions of each.
Tab	Complete the word with the next available match.  Press the <b>Tab</b> key multiple times to cycle through available matches.
Up arrow, or Ctrl + P	Recall the previous command.  Command memory is limited to the current session.
Down arrow, or Ctrl + N	Recall the next command.
Left or Right arrow	Move the cursor left or right within the command line.
Ctrl + A	Move the cursor to the beginning of the command line.
Ctrl + E	Move the cursor to the end of the command line.
Ctrl + B	Move the cursor backwards one word.
Ctrl + F	Move the cursor forwards one word.
Ctrl + D	Delete the current character.

Keys	Action
<b>Ctrl + C</b>	Abort current interactive commands, such as when entering multiple lines.  If you are not currently within an interactive command such as <code>config</code> or <code>edit</code> , this closes the CLI connection.
<b>\ then Enter</b>	Continue typing a command on the next line for a multi-line command.  For each line that you want to continue, terminate it with a backslash ( \ ). To complete the command line, terminate it by pressing the <b>spacebar</b> and then the <b>Enter</b> key, without an immediately preceding backslash.

## Command abbreviation

You can abbreviate words in the command line to their smallest number of non-ambiguous characters.

For example, the command `get system status` could be abbreviated to `g sy stat`.

## Adding and removing options from lists

When adding options to a list, such as a user group, using the `set` command will remove the previous configuration. For example, if you wish to add user D to a user group that already contains members A, B, and C, the command would need to be `set member A B C D`. If only `set member D` was used, then all former members would be removed from the group.

However, there are additional commands which can be used instead of `set` for changing options in a list.

### Additional commands for lists

<b>append</b>	Add an option to an existing list.  For example, <code>append member</code> would add user D to a user group while all previous group members are retained
<b>select</b>	Clear all options except for those specified.  For example, if a group contains members A, B, C, and D and you remove all users except for B, use the command <code>select member B</code> .
<b>unselect</b>	Remove an option from an existing list.  For example, <code>unselect member A</code> would remove member A from a group will all previous group members are retained.

## Environment variables

The CLI supports the following environment variables. Variable names are case-sensitive.

## Environment variables

<b>\$USERFROM</b>	The management access type ( <code>ssh</code> , <code>telnet</code> , <code>jsconsole</code> for the <b>CLI Console</b> widget in the web-based manager, and so on) and the IP address of the administrator that configured the item.
<b>\$USERNAME</b>	The account name of the administrator that configured the item.
<b>\$SerialNum</b>	The serial number of the FortiGate unit.

For example, the FortiGate unit's host name can be set to its serial number:

```
config system global
    set hostname $SerialNum
end
```

## Special characters

The following special characters, also known as reserved characters, are not permitted in most CLI fields:

<                      >                      (                      )                      #                      '                      “

You may be able to enter special characters as part of a string's value by using a special command, enclosing it in quotes, or preceding it with an escape sequence — in this case, a backslash ( \ ) character.

In other cases, different keystrokes are required to input a special character. If you need to enter **?** as part of config, you first need to input **CTRL-V**. If you enter **?** without first using **CTRL-V**, the question mark has a different meaning in the CLI; it will show available command options in that section.

For example, if you enter **?** without **CTRL-V**:

```
edit "*.xe
token line: Unmatched double quote.
```

If you enter **?** with **CTRL-V**:

```
edit "*.xe?"
new entry '*.xe?' added
```

## Entering special characters

Character	Keys
<b>?</b>	Ctrl + V then <b>?</b>
<b>Tab</b>	Ctrl + V then Tab

Character	Keys
<b>Space</b>  (to be interpreted as part of a string value, not to end the string)	Enclose the string in quotation marks: "Security Administrator".  Enclose the string in single quotes: 'Security Administrator'.  Precede the space with a backslash: Security\ Administrator.
'  (to be interpreted as part of a string value, not to end the string)	\'
"  (to be interpreted as part of a string value, not to end the string)	\"
\	\\

## Using grep to filter get and show command output

In many cases, the `get` and `show` (and `diagnose`) commands may produce a large amount of output. If you are looking for specific information in a large `get` or `show` command output, you can use the `grep` command to filter the output to only display what you are looking for. The `grep` command is based on the standard UNIX `grep`, used for searching text output based on regular expressions.

Use the following command to display the MAC address of the FortiGate unit internal interface:

```
get hardware nic internal | grep Current_HWaddr
Current_HWaddr           00:09:0f:cb:c2:75
```

Use the following command to display all TCP sessions in the session list and include the session list line number in the output:

```
get system session list | grep -n tcp
```

Use the following command to display all lines in HTTP replacement message commands that contain URL (upper or lower case):

```
show system replacemsg http | grep -i url
```

There are three additional options that can be applied to `grep`:

```
-A <num> After
-B <num> Before
-C <num> Context
```

The option `-f` is also available to support contextual output, in order to show the complete configuration. The following example shows the difference in output when `-f` option is used versus when it is not.

**Using -f:**

```
show | grep -f ldap-group1
config user group
  edit "ldap-group1"
    set member "pc40-LDAP"
  next
end
config firewall policy
  edit 2
    set srcintf "port31"
    set dstintf "port32"
    set srcaddr "all"
    set action accept
    set identity-based enable
    set nat enable
    config identity-based-policy
      edit 1
        set schedule "always"
        set groups "ldap-group1"
        set dstaddr "all"
        set service "ALL"
      next
    end
  next
end
```

**Without using -f:**

```
show | grep ldap-group1
edit "ldap-group1"
  set groups "ldap-group1"
```

## Language support and regular expressions

Characters such as ñ, é, symbols, and ideographs are sometimes acceptable input. Support varies by the nature of the item being configured. CLI commands, objects, field names, and options must use their exact ASCII characters, but some items with arbitrary names or values may be input using your language of choice. To use other languages in those cases, you must use the correct encoding.

Input is stored using Unicode UTF-8 encoding but is not normalized from other encodings into UTF-8 before it is stored. If your input method encodes some characters differently than in UTF-8, your configured items may not display or operate as expected.

Regular expressions are especially impacted. Matching uses the UTF-8 character values. If you enter a regular expression using another encoding, or if an HTTP client sends a request in an encoding other than UTF-8, matches may not be what you expect.

For example, with Shift-JIS, backslashes ( \ ) could be inadvertently interpreted as the symbol for the Japanese yen ( ¥ ) and vice versa. A regular expression intended to match HTTP requests containing money values with a yen symbol therefore may not work if the symbol is entered using the wrong encoding.

For best results, you should:

- use UTF-8 encoding, or
- use only the characters whose numerically encoded values are the same in UTF-8, such as the US-ASCII characters that are also encoded using the same values in ISO 8859-1, Windows code page 1252, Shift-JIS and other encodings, or
- for regular expressions that must match HTTP requests, use the same encoding as your HTTP clients.



HTTP clients may send requests in encodings other than UTF-8. Encodings usually vary by the client's operating system or input language. If you cannot predict the client's encoding, you may only be able to match any parts of the request that are in English, because regardless of the encoding, the values for English characters tend to be encoded identically. For example, English words may be legible regardless of interpreting a web page as either ISO 8859-1 or as GB2312, whereas simplified Chinese characters might only be legible if the page is interpreted as GB2312.

If you configure your FortiGate unit using other encodings, you may need to switch language settings on your management computer, including for your web browser or Telnet/SSH client. For instructions on how to configure your management computer's operating system language, locale, or input method, see its documentation.

If you choose to configure parts of the FortiGate unit using non-ASCII characters, verify that all systems interacting with the FortiGate unit also support the same encodings. You should also use the same encoding throughout the configuration if possible in order to avoid needing to switch the language settings of the web-based manager and your web browser or Telnet/SSH client while you work.

Similarly to input, your web browser or CLI client should normally interpret display output as encoded using UTF-8. If it does not, your configured items may not display correctly in the GUI or CLI. Exceptions include items such as regular expressions that you may have configured using other encodings in order to match the encoding of HTTP requests that the FortiGate unit receives.

#### To enter non-ASCII characters in the CLI Console:

1. On your management computer, start your web browser and go to the URL for the FortiGate unit's GUI.
2. Configure your web browser to interpret the page as UTF-8 encoded.
3. Log in to the FortiGate unit.
4. Open the CLI Console from the upper right-hand corner.
5. In the title bar of the **CLI Console** widget, click **Edit** (the pencil icon).
6. Enable **Use external command input box** and select **OK**.
7. The **Command** field appears below the usual input and display area of the **CLI Console**.
8. Type a command in this field and press **Enter**.

In the display area, the **CLI Console** widget displays your previous command interpreted into its character code equivalent, such as:

```
edit \743\601\613\743\601\652
```

and the command's output.

#### To enter non-ASCII characters in a Telnet/SSH client

1. On your management computer, start your Telnet or SSH client.
2. Configure your Telnet or SSH client to send and receive characters using UTF-8 encoding.  
Support for sending and receiving international characters varies by each Telnet/SSH client. Consult the documentation for your Telnet/SSH client.

3. Log in to the FortiGate unit.
4. At the command prompt, type your command and press **Enter**.

You may need to surround words that use encoded characters with single quotes ( ' ).

Depending on your Telnet/SSH client's support for your language's input methods and for sending international characters, you may need to interpret them into character codes before pressing Enter.

For example, you might need to enter:

```
edit '\743\601\613\743\601\652'
```

5. The CLI displays your previous command and its output.

## Screen paging

You can configure the CLI to pause after displaying each page's worth of text when displaying multiple pages of output. When the display pauses, the last line displays `--More--`. You can then either:

- press the **spacebar** to display the next page.
- type `q` to truncate the output and return to the command prompt.

This may be useful when displaying lengthy output, such as the list of possible matching commands for command completion, or a long list of settings. Rather than scrolling through or possibly exceeding the buffer of your terminal emulator, you can simply display one page at a time.

To configure the CLI Console to pause display when the screen is full:

```
config system console
    set output more
end
```

## Baud rate

You can change the default baud rate of the local console connection.

To change the baud rate enter the following commands:

```
config system console
    set baudrate {9600 | 19200 | 38400 | 57600 | 115200}
end
```

## Editing the configuration file on an external host

You can edit the FortiGate configuration on an external host by first backing up the configuration file to a TFTP server. Then edit the configuration file and restore it to the FortiGate unit.

Editing the configuration on an external host can be timesaving if you have many changes to make, especially if your plain text editor provides advanced features such as batch changes.

**To edit the configuration on your computer:**

1. Use `execute backup` to download the configuration file to a TFTP server, such as your management computer.
2. Edit the configuration file using a plain text editor that supports Unix-style line endings.



Do not edit the first line. The first line(s) of the configuration file (preceded by a # character) contains information about the firmware version and FortiGate model. If you change the model number, the FortiGate unit will reject the configuration file when you attempt to restore it.

---

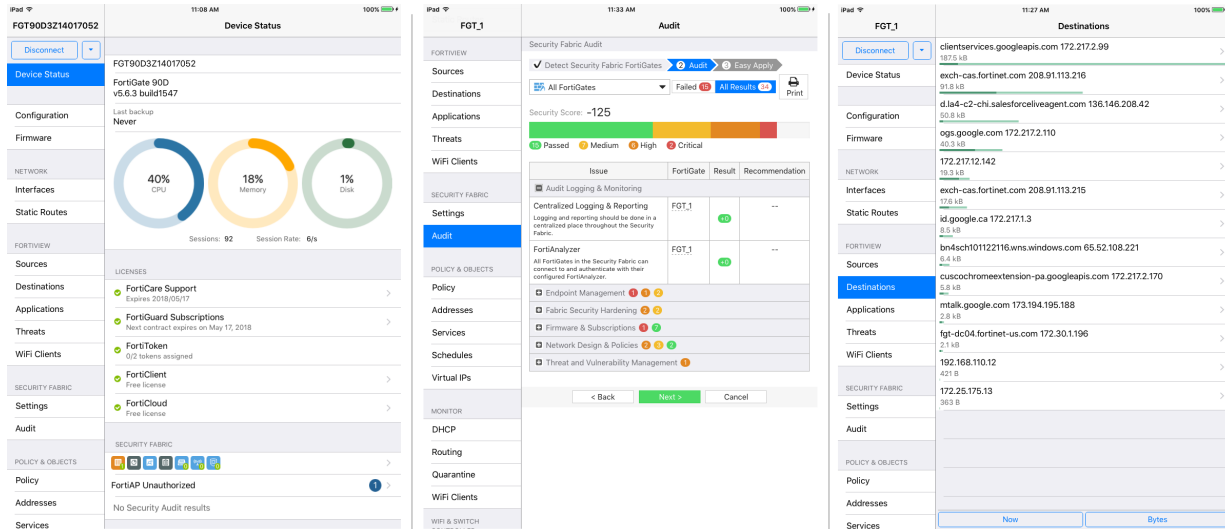
3. Use `execute restore` to upload the modified configuration file back to your FortiGate.

The FortiGate downloads the configuration file and checks that the model information is correct. If it is correct, the FortiGate unit loads the configuration file and checks each command for errors. If a command is invalid, the FortiGate unit ignores the command. If the configuration file is valid, the FortiGate unit restarts and loads the new configuration.



# FortiExplorer for iOS

FortiExplorer for iOS is a user-friendly application that helps you to quickly and easily configure, manage, and monitor FortiGate appliances using an iOS device. FortiExplorer lets you rapidly provision, deploy, and monitor Security Fabric components including FortiGate, FortiWiFi, and FortiAP devices.



FortiExplorer for iOS requires iOS 9.3 or later and is compatible with iPhone, iPad, and iPod Touch. It is supported by FortiOS 5.6+ and is [only available on the App Store](#) for iOS devices.

Advanced features are available with the purchase of FortiExplorer Pro. Paid features include the ability to add more than two devices and the ability to download firmware images from FortiCare.

Up to six members can use this app with 'Family Sharing' enabled in the App Store.

## Getting started with FortiExplorer

If your FortiGate is accessible on the wireless network, you can connect to it using FortiExplorer provided that your iOS device is on the same network (see [Connecting FortiExplorer to a FortiGate via WiFi](#)). Otherwise, you will need to physically connect your iOS device to the FortiGate using a USB cable (see below).

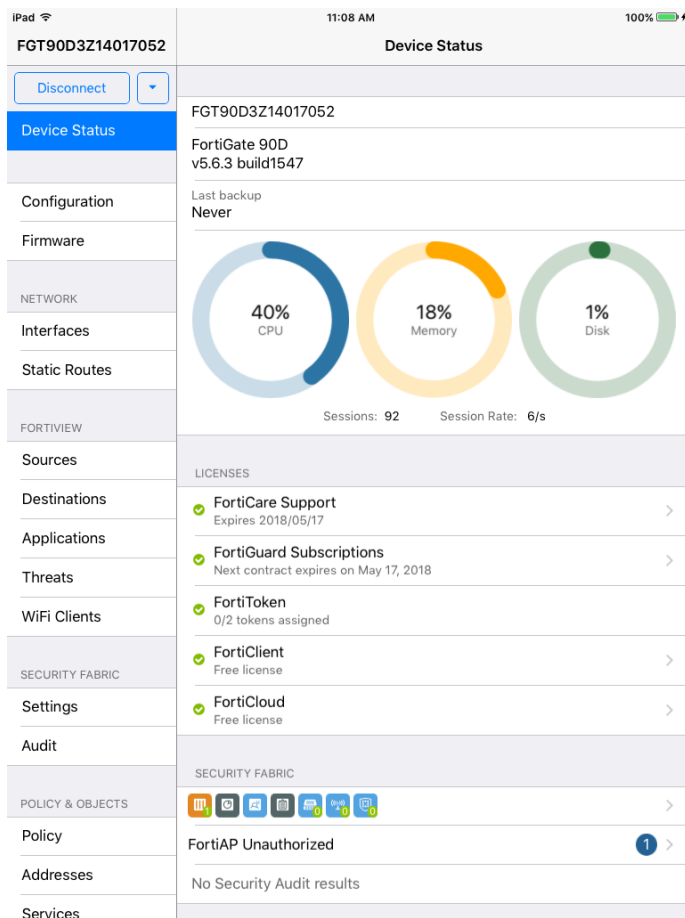
## Connecting FortiExplorer to a FortiGate via USB

For the purpose of this document, we assume that you are just getting started; you do not have access to the FortiGate over the wireless network, and the FortiGate is in its factory configuration.

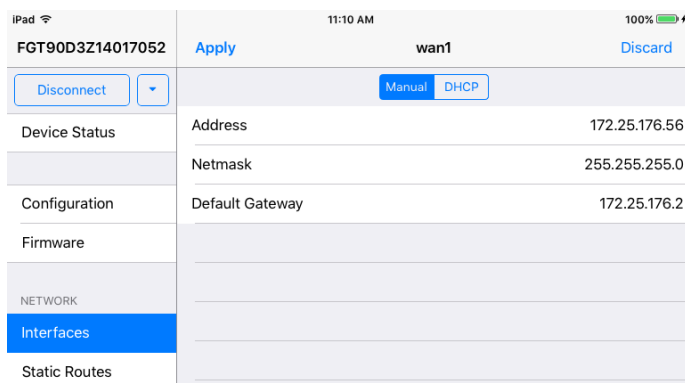
1. Connect your iOS device to your FortiGate's USB management port.  
If prompted on your iOS device, **Trust** this 'computer'.
2. Open the FortiExplorer app and select your FortiGate from the list under **USB Attached Device**.
3. On the **Login** screen, select **USB**.

4. Enter the default **Username** (`admin`) and leave the **Password** field blank.
5. You can opt to **Remember Password**. Tap **Done** when you are ready.

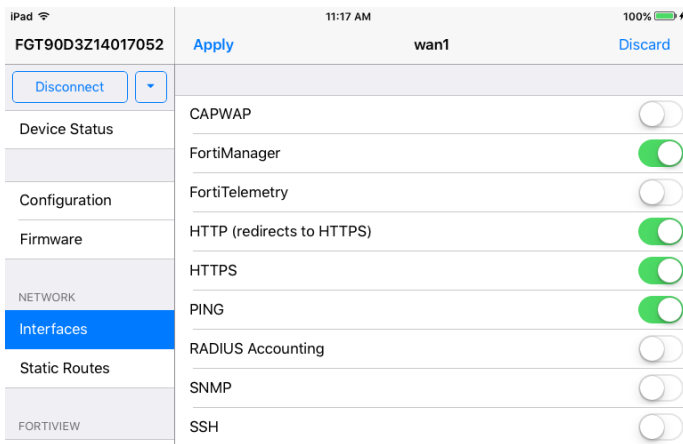
FortiExplorer opens the FortiGate management interface to the **Device Status** page:



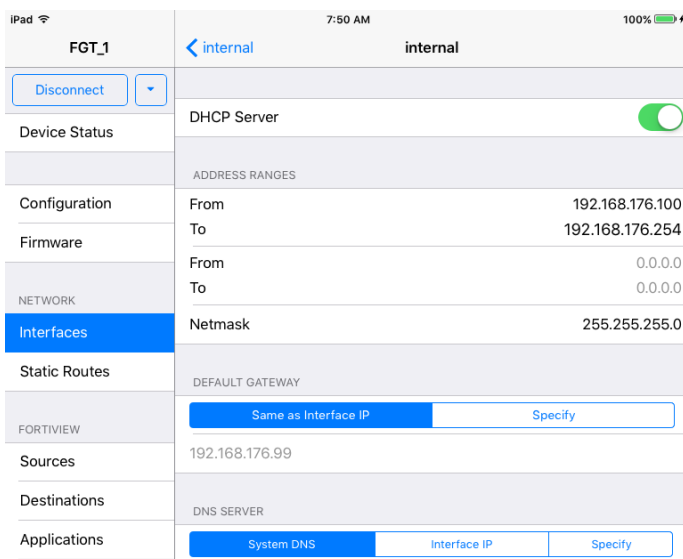
6. Go to **Network > Interfaces** and configure the WAN interface(s).  
In the example, the **wan1** interface **Address** mode is set to **DHCP** by default. Set it to **Manual** and enter its **Address**, **Netmask**, and **Default Gateway**, and then **Apply** your changes.




7. (Optional) Configure **Administrative Access** to allow **HTTP** and **HTTPS** access.  
This will allow administrators to access the FortiGate web-based manager using a web browser.

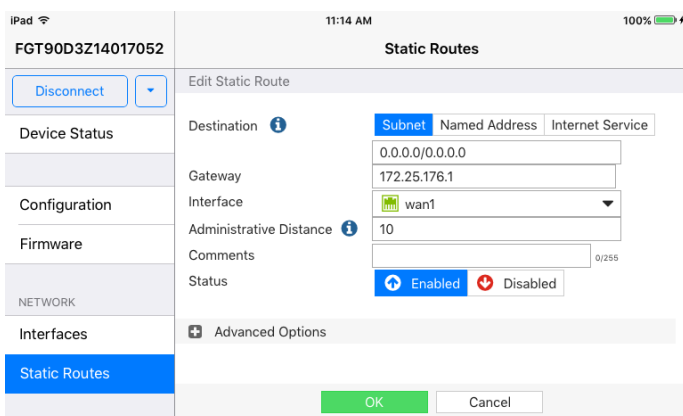


8. Go to **Network > Interfaces** and configure the local network (internal) interface. Set the **Address** mode as before and configure **Administrative Access** if desired.
9. Configure a **DHCP Server** for the internal network subnet.



Return to the internal interface using the  button at the top of the screen.

10. Go to **Network > Static Routes** and configure the static route to the gateway.



11. Go to **Policy & Objects > Policy** and edit the Internet access policy. As a best practice, provide a **Name** for the policy, enable the desired **Security Profiles**, and configure **Logging Options**. Select **OK** to finalize.

Device Status

Configuration

Firmware

NETWORK

Interfaces

Static Routes

FORTIVIEW

Sources

Destinations

Applications

Threats

WiFi Clients

SECURITY FABRIC

Settings

Audit

POLICY & OBJECTS

**Policy**

Addresses

Services

11:11 AM 100%

Policy

Edit Policy

Name

Incoming Interface internal

Outgoing Interface wan1

Source all

Destination all

Schedule always

Service ALL

Action ACCEPT DENY LEARN

Firewall / Network Options

NAT

IP Pool Configuration Use Outgoing Interface Address Use Dynamic IP Pool

Security Profiles

AntiVirus

Web Filter

DNS Filter

Application Control

SSL Inspection

Logging Options

Log Allowed Traffic Security Events All Sessions

Capture Packets

Comments Write a comment... 0/1023

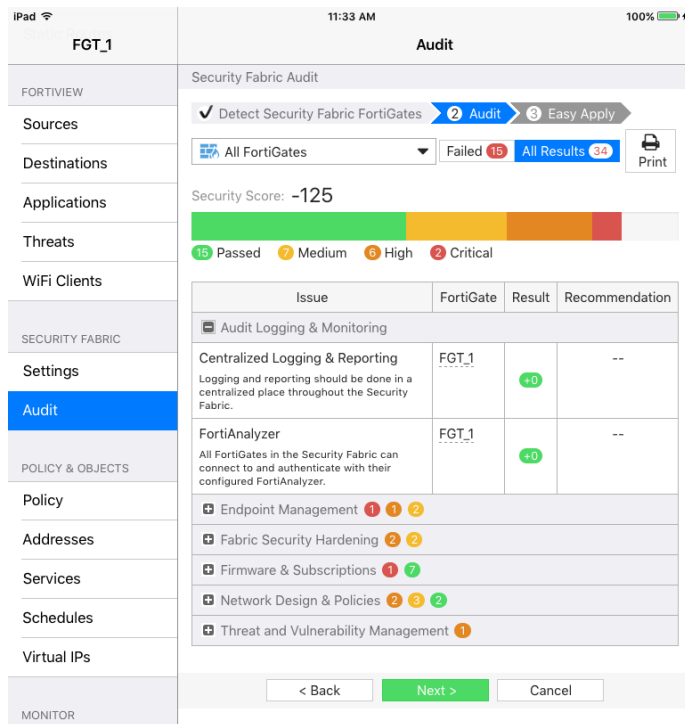
Enable this policy

OK Cancel

## Running a Security Fabric Rating

The FortiGate is now configured in a very basic state. Once you've configured the other potential elements of your network, such as other **Interfaces**, **Schedules**, or **Managed FortiAPs**, it is recommended that you run a **Security Fabric Rating** to identify potential vulnerabilities and highlight best practices that could be used to improve your network's overall security and performance.

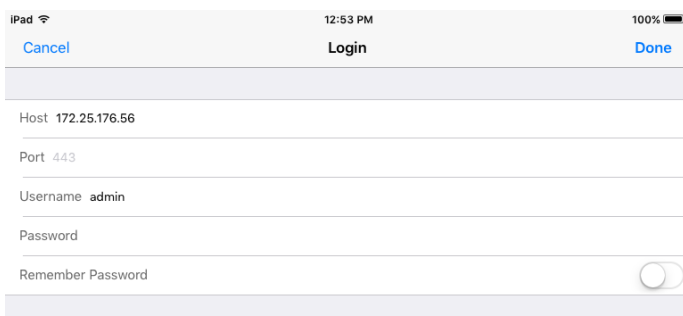
Go to **Security Fabric > Security Rating** and follow the steps to determine a **Security Score** for the selected device(s). The results should identify issues ranging from Medium to Critical importance, and may provide recommended actions where possible.



## Connecting FortiExplorer to a FortiGate via WiFi

If your FortiGate is accessible on the wireless network, you can connect to it using FortiExplorer provided that your iOS device is on the same network. Assuming this is the case:

1. Open the FortiExplorer app and select **Add** from the **Devices** page.
2. Enter the **Host** information and appropriate **Username** and **Password** credentials. If necessary, change the default **Port** number, and opt to **Remember Password**.



3. If the FortiGate device identity cannot be verified, click **Connect** at the prompt. FortiExplorer opens the FortiGate management interface to the **Device Status** page.

## Upgrading to FortiExplorer Pro

Paid features provided with the purchase of FortiExplorer Pro include the ability to add more than two devices and the ability to download firmware images from FortiCare.

- To upgrade to FortiExplorer Pro, open the FortiExplorer app, go to **Settings** and select **Upgrade to FortiExplorer Pro**. Follow the on-screen prompts.

# LED Specifications

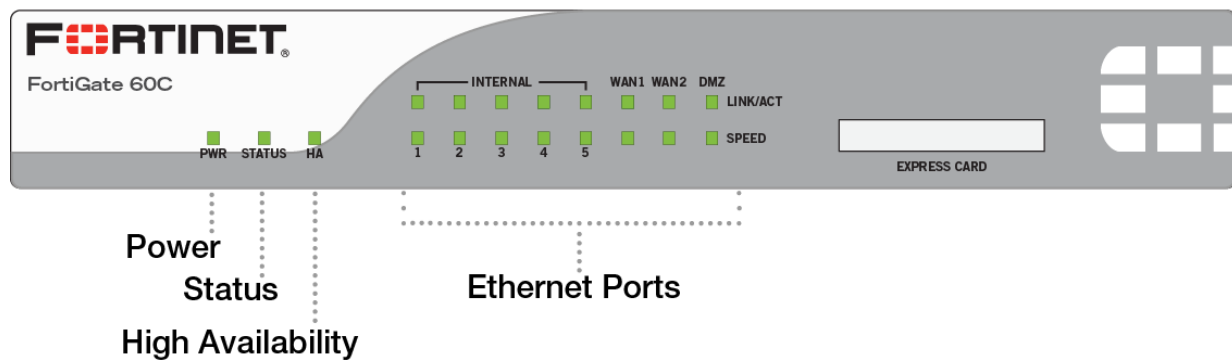
The following section includes information regarding FortiGate LED status indicators.

- [Sample FortiGate faceplates](#)
- [LED status codes](#)
- [About alarm levels](#)
- [LED status codes for ports](#)

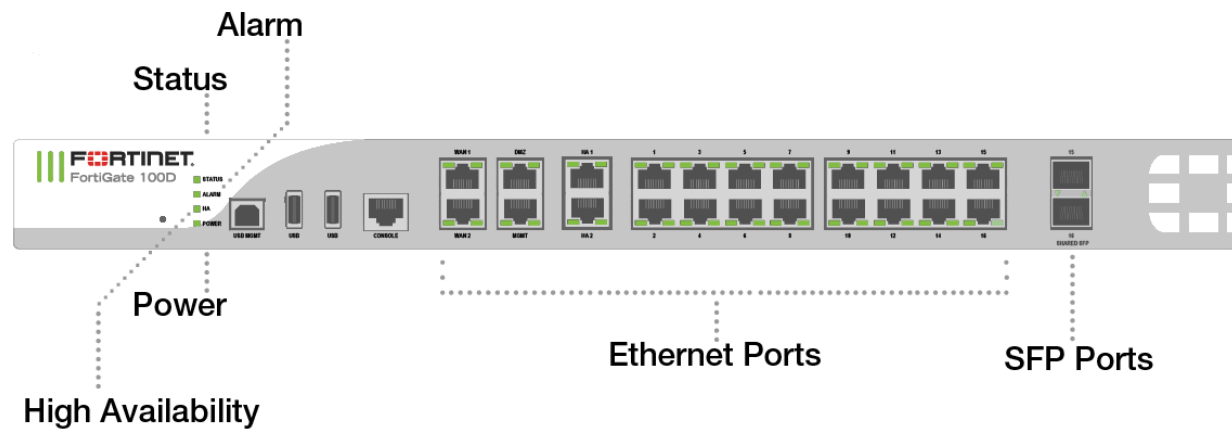
## Sample FortiGate faceplates

The faceplates indicate where the LEDs are typically found on desktop and mid-range FortiGate models.

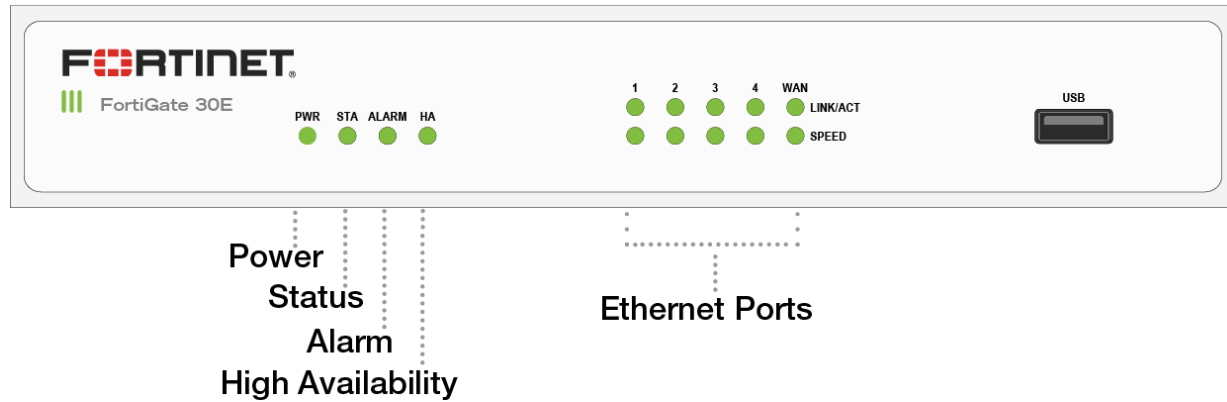
### FortiGate 60C



### FortiGate 100D



## FortiGate 30E



## LED status codes

LABEL	STATE	MEANING
<b>PWR</b>	Green	Power is On.
	Off	Power is Off.
<b>STA</b>	Green	Normal status.
	Flashing Green	Booting Up. If the FortiGate has a reset button, Flashing Green also means that the reset button was used.
	Red	The FortiGate has a critical alarm (see <a href="#">About Alarm Levels</a> ).
<b>ALARM</b>	Off	No alarms or the FortiGate has a minor alarm.
	Amber	The FortiGate has a major alarm.
	Red	The FortiGate has a critical alarm. The status LED will also be red.
		More information at <a href="#">About Alarm Levels</a> .
<b>HA</b>	Green	FortiGate is operating in an FGCP HA cluster.
	Red	A failover has occurred.
	Off	HA not configured.
		Failover operation feature not available in all units.



LABEL	STATE	MEANING
<b>WIFI</b>	Green	Wireless port is active.
	Flashing Green	Wireless interface is transmitting and receiving data.
	Off	Wireless interface is down.

## About alarm levels

Minor, major, and critical alarms are defined based on IPMI, ATCA, and Telco standards for naming alarms.

- A minor alarm (also called an IPMI non-critical (NC) alarm) indicates a temperature or a power level outside of the normal operating range that is not considered a problem. In the case of a minor temperature alarm, the system could respond by increasing fan speed. A non-critical threshold can be an upper non-critical (UNC) threshold (for example, a high temperature or a high power level) or a lower non-critical (LNC) threshold (for example, a low power level). The LEDs do not indicate minor alarms since user intervention is not required.
- A major alarm (also called an IPMI critical or critical recoverable (CR) alarm) indicates that the system itself cannot correct the cause for the alarm and that intervention is required. For example, the cooling system cannot provide enough cooling to reduce the temperature. It could also mean that conditions (e.g. temperature) are approaching the outside limit of the allowed operating range. A critical threshold can also be an upper critical (UC) threshold (e.g. a high temperature or a high power level) or a lower critical (LC) threshold (e.g. a low power level).
- A critical alarm (also called an IPMI non-recoverable (NR) alarm) indicates detection of a temperature or power level that is outside of the allowed operating range and could potentially cause physical damage.

## LED status codes for ports

TYPE OF PORT	STATE	MEANING
<b>Ethernet Ports Link / Activity</b>	Green	Connected.
	Flashing Green	Transmitting and receiving data.
	Off	No link established.
		On FortiGate models with front-facing ports, this LED is to the left of the port. On FortiGate models with ports at the back of the device, this LED is in the upper row.
<b>SFP Ports</b>	Green	Connected.
	Flashing Green	Transmitting and receiving data.
	Off	No link established.

TYPE OF PORT	STATE	MEANING
<b>Ethernet Ports Speed</b>	Green	Connected at 1Gbps.
	Amber	Connected at 100Mbps.
	Off	Not connected or connected at 10Mbps.
		On FortiGate models with front-facing ports, this LED is to the right of the port. On FortiGate models with ports at the back of the device, this LED is in the lower row.

# Inspection Mode

To control your FortiGate's security profile inspection mode in FortiOS 6.0, you can select **Flow-based** or **Proxy** inspection modes from **System > Settings**. Having control over flow and proxy mode is helpful if you want to ensure that only flow inspection mode is used.

In most cases proxy mode is preferred because more security profile features are available along with more configuration options for these individual features. Some implementations, however, may require all security profile scanning to only use flow mode. In this case, you can set your FortiGate to flow mode knowing that proxy mode inspection will not be used.

Setting up the FortiGate to operate in these new modes (or to operate in the other available operating modes) involves going to **System > Settings** and changing the **Inspection Mode** and **NGFW Mode**.

NGFW mode simplifies applying application control and web filtering to traffic by allowing you to add applications and web filtering profiles directly to policies.

Transparent proxy allows you to apply web authentication to HTTP traffic without using the explicit proxy.

## Changing inspection and policy modes

To change inspection modes, go to **System > Settings**. You can select **Flow-based** or **Proxy** inspection modes.

## NGFW mode

When you select **Flow-based** as the **Inspection Mode**, you have the option to select an **NGFW Mode**. In **NGFW Profile-based** mode, you configure Application Control and Web-Filtering profiles in **Security Profiles** and then apply them to a policy.

In **Policy-based** mode, you add applications and web filtering profiles directly to a policy without having to first create and configure Application Control or Web Filtering profiles.

When you change to **Flow-based** inspection, all proxy mode profiles are converted to flow mode, and proxy settings are removed. In addition, proxy-mode only features (for example, Web Application Profile) are removed from the GUI.

If your FortiGate has multiple VDOMs, you can set the inspection mode independently for each VDOM. Go to **System > VDOM**. Click **Edit** for the VDOM you want to change and select the **Inspection Mode**.

## CLI syntax

You can use the following CLI command to configure NGFW mode:

```
config system settings
    set inspection-mode flow
    set ngfw-mode {profile-based | policy-based}
    set ssl-ssh-profile "certificate-inspection"
end
```

## Security profile features mapped to inspection mode

The table below lists FortiOS security profile features and shows whether they are available in flow-based or proxy-based inspection modes.

Security Profile Feature	Flow-based inspection	Proxy-based inspection
AntiVirus	x	x
Web Filter	x	x
DNS Filter	x	x
Application Control	x	x
Intrusion Protection	x	x
Anti-Spam		x
Data Leak Protection		x
VoIP		x
ICAP		x
Web Application Firewall		x
FortiClient Profiles	x	x
Proxy Options	x	x
SSL Inspection	x	x
SSH Inspection		x
Web Rating Overrides	x	x
Web Profile Overrides		x

From the GUI, you can only configure antivirus and web filter security profiles in proxy mode. From the CLI, you can configure flow-based antivirus profiles, web filter profiles, and DLP profiles and they will appear on the GUI and include their inspection mode setting. Flow-based profiles created when in flow mode are still available when you switch to proxy mode.

In flow mode, antivirus and web filter profiles only include flow-mode features. Web filtering and virus scanning is still done with the same engines and to the same accuracy, but some inspection options are limited or not available in flow mode. Application control, intrusion protection, and FortiClient profiles are not affected when switching between flow and proxy mode.

Even though VoIP profiles are not available from the GUI in flow mode, the FortiGate can process VoIP traffic. In this case the appropriate session helper is used (for example, the SIP session helper).

Setting flow or proxy mode doesn't change the settings available from the CLI. However, when in flow mode you can't save security profiles that are set to proxy mode.

You can also add proxy-only security profiles to firewall policies from the CLI. So, for example, you can add a VoIP profile to a security policy that accepts VoIP traffic. This practice isn't recommended because the setting will not be visible from the GUI.

## Proxy mode and flow mode antivirus and web filter profile options

The following tables list the antivirus and web filter profile options available in proxy and flow modes.

### Antivirus features in proxy and flow mode

Feature	Proxy	Flow
Scan Mode (Quick or Full)		<b>x</b>
Detect viruses (Block or Monitor)	<b>x</b>	<b>x</b>
Inspected protocols	<b>x</b>	(all relevant protocols are inspected)
Inspection Options	<b>x</b>	<b>x</b> (not available for quick scan mode)
Treat Windows Executables in Email Attachments as Viruses	<b>x</b>	<b>x</b>
Send Files to FortiSandbox Appliance for Inspection	<b>x</b>	<b>x</b>
Use FortiSandbox Database	<b>x</b>	<b>x</b>
Include Mobile Malware Protection	<b>x</b>	<b>x</b>

### Web Filter features in proxy and flow mode

Feature	Proxy	Flow
FortiGuard category based filter	<b>x</b>	<b>x</b> (show, allow, monitor, block)
Category Usage Quota	<b>x</b>	
Allow users to override blocked categories (on some models)	<b>x</b>	
Search Engines	<b>x</b>	

Feature		Proxy	Flow
	Enforce 'Safe Search' on Google, Yahoo!, Bing, Yandex	x	
	Restrict YouTube Access	x	
	Log all search keywords	x	
Static URL Filter		x	x
	Block invalid URLs	x	
	URL Filter	x	x
	Block malicious URLs discovered by FortiSandbox	x	x
	Web Content Filter	x	x
Rating Options		x	x
	Allow websites when a rating error occurs	x	x
	Rate URLs by domain and IP Address	x	x
	Block HTTP redirects by rating	x	
	Rate images by URL	x	
Proxy Options		x	
	Restrict Google account usage to specific domains	x	
	Provide details for blocked HTTP 4xx and 5xx errors	x	
	HTTP POST Action	x	
	Remove Java Applets	x	
	Remove ActiveX	x	
	Remove Cookies	x	
	Filter Per-User Black/White List	x	

# Basic Administration

This section contains information about basic FortiGate administration that can be done after you have installed the unit in your network.

While this section mainly focuses on accomplishing tasks with the GUI, some tasks include instructions to use the CLI. You can access the CLI using the GUI or FortiExplorer, or via SSH or Telnet connection. For more information about the CLI, see [Using the CLI](#).

## Registration

In order to have full access to Fortinet Support and FortiGuard Services, you must register your FortiGate.

### Registering your FortiGate:

1. Go to the **Dashboard** and locate the **Licenses** widget.
2. Click on **FortiCare Support** to display a pop-up window and **Register**.
3. In the pop-up window, either use an existing Fortinet Support account or create a new one. Select your **Country** and **Reseller**.
4. Select **OK**.

FortiGate platforms do not impose any limitations on the number or type of customers, users, devices, IP addresses, or number of VPN clients being served by the platform. Such factors are limited solely by the hardware capacity of each given model.

## System Settings

There are several system settings that should be configured once your FortiGate is installed:

- [Default administrator password](#)
- [Settings](#)
  - [Changing the host name](#)
  - [System Time](#)
  - [Administration Settings](#)
  - [Password Policy](#)
  - [View Settings](#)
- [Administrator password retries and lockout time](#)

### Default administrator password

By default, your FortiGate has an administrator account set up with the username `admin` and no password. In order to prevent unauthorized access to the FortiGate, it is highly recommended that you add a password to this account.

**To change the default password:**

1. Go to **System > Administrators**.
2. Edit the **admin** account.
3. Select **Change Password**.
4. Enter the **New Password** and re-enter the password for confirmation.
5. Select **OK**.

For details on selecting a password and password best practices, see the section on [Passwords](#).

It is also recommended to change the user name of this account; however, since you cannot change the user name of an account that is currently in use, a second administrator account will need to be created in order to do this. For more information about creating and using administrator accounts, see the Administrators section of the [System Administration](#) chapter.

## Settings

Settings can be accessed by going to **System > Settings**. On this page, you can change the **Host name**, set the system time and identify time zone in **System Time**, configure HTTP, HTTPS, SSH, and Telnet ports as well as idle timeout in **Administration Settings**, designate the **Password Policy**, and manage display options and designate inspection mode in **View Settings**.

### Changing the host name

The host name of your FortiGate appears in the **Hostname** row in the **System Information** widget on the Dashboard. The host name also appears at the CLI prompt when you are logged in to the CLI, and as the SNMP system name.

**To change the host name on the FortiGate**

Go to **System > Settings** and type in the new name in the **Host name** row. The only administrators that can change a FortiGate's host name are administrators whose admin profiles permit system configuration write access. If the FortiGate is part of an HA cluster, you should use a unique host name to distinguish the FortiGate from others in the cluster.

### System Time

For effective scheduling and logging, the FortiGate system time and date should be accurate. You can either manually set the system time and date or configure the FortiGate to automatically synchronize with a Network Time Protocol (NTP) server.

NTP enables you to keep the FortiGate time synchronized with other network systems. By enabling NTP on the FortiGate, FortiOS will check with the NTP server you select at the configured intervals. This will also ensure that logs and other time-sensitive settings on the FortiGate are correct.

The FortiGate maintains its internal clock using a built-in battery. At start up, the time reported by the FortiGate will indicate the hardware clock time, which may not be accurate. When using NTP, the system time might change after the FortiGate has successfully obtained the time from a configured NTP server.





By default, FortiOS has the daylight savings time configuration enabled. The system time must be manually adjusted after daylight saving time ends. To disable DST, enter the following commands in the CLI:

```
config system global
    set dst disable
end
```

### To set the date and time

1. Go to the **System > Settings**.
2. Under **System Time**, select your **Time Zone** by using the drop-down menu.
3. **Set Time** by either selecting **Synchronize with NTP Server** or **Manual settings**. If you select synchronization, you can either use the default FortiGuard servers or specify a custom server. You can also set the **Sync interval**.
4. If you use an NTP server, you can identify a specific interface for this self-originating traffic by enabling **Setup device as local NTP server**.
5. Select **Apply**.

## Administration Settings

In order to improve security, you can change the default port configurations for administrative connections to the FortiGate. When connecting to the FortiGate when the port has changed, the port must be included, such as `https://<ip_address>:<port>`. For example, if you are connecting to the FortiGate using port 99, the URL would be `https://192.168.1.1.99:99`.

### To configure the port settings:

1. Go to **System > Settings**.
2. Under **Administration Settings**, change the port numbers for HTTP, HTTPS, SSH, and/or Telnet as needed. You can also select **Redirect to HTTPS** in order to avoid HTTP being used for the administrators.
3. Select **Apply**.

When you change the default port number for HTTP, HTTPS, SSH, or Telnet, ensure that the port number is unique. If a conflict exists with a particular port, a warning message will appear.

By default, the GUI disconnects administrative sessions if no activity occurs for five minutes. This prevents someone from using the GUI if the management PC is left unattended.

### To change the idle timeout

1. Go to **System > Settings**.
2. In the **Administration Settings** section, enter the time in minutes in the **Idle timeout** field.
3. Select **Apply**.

## Password Policy

The FortiGate includes the ability to create a password policy for administrators and IPsec pre-shared keys. With this policy, you can enforce regular changes and specific criteria for a password including:

- minimum length between 8 and 64 characters.
- if the password must contain uppercase (A, B, C) and/or lowercase (a, b, c) characters.

- if the password must contain numbers (1, 2, 3).
- if the password must contain special or non-alphanumeric characters (!, @, #, \$, %, ^, &, \*, (, and )).
- where the password applies (admin or IPsec or both).
- the duration of the password before a new one must be specified.

### To create a password policy - GUI

1. Go to **System > Settings**.
2. Configure **Password Policy** settings as required.
3. Click **Apply**.

If you add a password policy or change the requirements on an existing policy, the next time that administrator logs into the FortiGate, they are prompted to update their password to meet the new requirements before proceeding to log in.

For information about recovering a lost password and enhancements to the process, see: [Resetting a lost Admin password](#) on the Fortinet Cookbook site.

## View Settings

Three settings can change the presentation of information in the GUI: **Language**, **Lines per page**, and **Theme**.

To change the language, go to **System > Settings**. Select the language you want from the **Language** drop-down list: English (the default), French, Spanish, Portuguese, Japanese, Traditional Chinese, Simplified Chinese, or Korean. For best results, you should select the language that is used by the management computer.

To change the number of lines per page displayed in the GUI tables, set **Lines per page** to a value between 20 and 1,000. The default is 50 lines per page.

Five color themes are currently available: Green (the default), Red, Blue, Melongene, and Mariner. To change your theme, select the color from the **Theme** drop-down list.

This is also where you select either **Flow-based** or **Proxy Inspection Mode**. If you select Flow-based mode, then you need to specify if it is **NGFW Profile-based** or **NGFW Policy-based** inspection.

## Administrator password retries and lockout time

By default, the FortiGate sets the number of password retries at three, allowing the administrator a maximum of three attempts to log into their account before locking the account for a set amount of time.

Both the number of attempts (`admin-lockout-threshold`) and the wait time before the administrator can try to enter a password again (`admin-lockout-duration`) can be configured within the CLI.

### To configure the lockout options:

```
config system global
    set admin-lockout-threshold <failed_attempts>
    set admin-lockout-duration <seconds>
end
```

The default value of `admin-lockout-threshold` is 3 and the range of values is between 1 and 10. The `admin-lockout-duration` is set to 60 seconds by default and the range of values is between 1 and 4294967295 seconds.

Keep in mind that the higher the lockout threshold, the higher the risk that someone may be able to break into the FortiGate.

**Example:**

To set the `admin-lockout-threshold` to one attempt and the `admin-lockout-duration` to a five minute duration before the administrator can try to log in again, enter the commands:

```
config system global
  set admin-lockout-threshold 1
  set admin-lockout-duration 300
end
```



If the time span between the first failed login attempt and the `admin-lockout-threshold` failed login attempt is less than `admin-lockout-duration`, the lockout will be triggered.

## Passwords

Using secure passwords are vital for preventing unauthorized access to your FortiGate. When changing the password, consider the following to ensure better security:

- Do not make passwords that are obvious, such as the company name, administrator names, or other obvious words or phrases.
- Use numbers in place of letters, for example, `passw0rd`.
- Administrator passwords can be up to 64 characters.
- Include a mixture of letters, numbers, and upper and lower case.
- Use multiple words together, or possibly even a sentence, for example `keytothehighway`.
- Use a password generator.
- Change the password regularly and always make the new password unique and not a variation of the existing password, such as changing from `password` to `password1`.
- Make note of the password and store it in a safe place away from the management computer, in case you forget it or ensure that at least two people know the password in the event that one person becomes ill, is away on vacation, or leaves the company. Alternatively, have two different admin logins.

Downgrades will typically maintain the administrator password. If you need to downgrade to FortiOS 4.3, remove the password before the downgrade, then log in after the downgrade and re-configure the password.

## Password policy

The FortiGate includes the ability to create a password policy for administrators and IPsec pre-shared keys. With this policy, you can enforce regular changes and specific criteria for a password including:

- minimum length between 8 and 64 characters.
- if the password must contain uppercase (A, B, C) and/or lowercase (a, b, c) characters.
- if the password must contain numbers (1, 2, 3).
- if the password must contain special or non-alphanumeric characters (!, @, #, \$, %, ^, &, \*, (, and )).

- where the password applies (admin or IPsec or both).
- the duration of the password before a new one must be specified.

**To create a password policy - GUI**

1. Go to **System > Settings**.
2. Configure **Password Policy** settings as required.
3. Click **Apply**.

If you add a password policy or change the requirements on an existing policy, the next time that administrator logs into the FortiGate, they are prompted to update their password to meet the new requirements before proceeding to log in.

For information about recovering a lost password and enhancements to the process, see: [Resetting a lost Admin password](#) on the Fortinet Cookbook site.

## Firmware

Fortinet periodically updates the FortiGate firmware to include new features and resolve important issues. After you have registered your FortiGate unit, you can download firmware updates from the support web site, <https://support.fortinet.com>.

Before you install any new firmware, be sure to follow the steps below:

- Review the [Release Notes](#) for a new firmware release.
- Review the [Supported Upgrade Paths](#) Sys Admin note on the Fortinet Cookbook site to make sure the upgrade from your current image to the desired new image is supported.
- Backup the current configuration, including local certificates.
- Test the new firmware until you are satisfied that it applies to your configuration.

Installing new firmware without reviewing release notes or testing the firmware may result in changes to settings or unexpected issues.



Only FortiGate admin users and administrators whose access profiles contain system read and write privileges can change the FortiGate firmware.

---

## Backing up the current configuration

You should always back up the configuration before installing new firmware, in case you need to restore your FortiGate configuration.

### To create a local backup:

1. Open to the administrator's dropdown menu in the top-right corner of the GUI and select **Configuration > Backup**.
2. Choose either **Local PC** or **USB Disk** to save the configuration file. The USB option will not be available if there is no USB drive in the USB port.
3. If desired, select **Encryption**.
4. Select **OK**.

For more information, see [Configuration Backups](#).

## Restoring configuration

Rather than reconfigure the FortiGate manually, it is possible to upload a saved configuration file.

### To restore your FortiGate configuration:

1. Open to the administrator's dropdown menu in the top-right corner of the GUI and select **Configuration > Restore**.
2. Choose either **Local PC** or **USB Disk** to restore the configuration file from.
3. Select **Upload** beside **File**.
4. Locate and then select the correct file in the file manager window.

5. If a password was associated with the configuration file, enter it in the **Password** field.
6. Select **OK**.

## Troubleshooting

During the installation, some possible errors may occur, but the solutions are usually straightforward.

Error message	Reason and Solution
Configuration file error	<p>This error occurs when attempting to upload a configuration file that is incompatible with the device. This may be due to the configuration file being for a different model or being saved from a different version of firmware.</p> <p><b>Solution:</b> Upload a configuration file that is for the correct model of FortiGate device and the correct version of the firmware.</p>
Invalid password	<p>When the configuration file is saved, it can be protected by a password. The password entered during the upload process is not matching the one associated with the configuration file.</p> <p><b>Solution:</b> Use the correct password if the file is password protected.</p>

## Downloading firmware

Firmware images for all FortiGate units are available on the Fortinet Customer Support website, <https://support.fortinet.com>.

### To download firmware:

1. Log into the site using your user name and password.
2. Go to **Download > Firmware Images**.
3. A list of Release Notes is shown. If you have not already done so, download and review the Release Notes for the firmware you wish to upgrade your FortiGate unit to.
4. Select **Download**.



Firmware can also be downloaded using FTP; however, as FTP is not an encrypted file transferring protocol, HTTPS downloading is recommended.

5. Navigate to the folder for the firmware version you wish to use.
6. Select your FortiGate model from the list. If your unit is a FortiWiFi, the firmware will have a filename starting with 'FWF'.
7. Save the firmware image to your computer.

## Testing new firmware

The integrity of firmware images downloaded from Fortinet's support portal can be verified using a file checksum. A file checksum that does not match the expected value indicates a corrupt file. The corruption could be caused

by errors in transfer or by file modification. A list of expected checksum values for each build of released code is available on Fortinet's support portal.

Image integrity is also verified when the FortiGate is booting up. This integrity check is done through a cyclic redundancy check (CRC). If the CRC fails, the FortiGate unit will encounter an error during the boot process.

Lastly, firmware images are signed and the signature is attached to the code as it is built. When upgrading an image, the running OS will generate a signature and compare it with the signature attached to the image. If the signatures do not match, the new OS will not load.

## Testing before installation

FortiOS lets you test a new firmware image by installing the firmware image from a system reboot and saving it to system memory. After completing this procedure, the FortiGate unit operates using the new firmware image with the current configuration. This new firmware image is not permanently installed. The next time the FortiGate unit restarts, it operates with the originally installed firmware image using the current configuration. If the new firmware image operates successfully, you can install it permanently using the procedure explained in [Testing new firmware on page 70](#).

To use this procedure, you must connect to the CLI using the FortiGate console port and an RJ-45 to DB-9 or null modem cable. This procedure temporarily installs a new firmware image using your current configuration.

For this procedure, you must install a TFTP server that you can connect to from the FortiGate internal interface. The TFTP server should be on the same subnet as the internal interface.

### To test the new firmware image:

1. Connect to the CLI using an RJ-45 to DB-9 or null modem cable.
2. Make sure the TFTP server is running.
3. Copy the new firmware image file to the root directory of the TFTP server.
4. Make sure the FortiGate unit can connect to the TFTP server using the `execute ping` command.
5. Enter the following command to restart the FortiGate unit:  
`execute reboot`
6. As the FortiGate unit reboots, press any key to interrupt the system startup. As the FortiGate unit starts, a series of system startup messages appears:  
`Press any key to display configuration menu....`
7. Immediately press any key to interrupt the system startup.



You have only three (3) seconds to press any key. If you do not press a key quickly enough, the FortiGate unit reboots and you must log in and repeat the `execute reboot` command.

If you successfully interrupt the startup process, the following messages appears:

```
[G]: Get firmware image from TFTP server.
[F]: Format boot device.
[B]: Boot with backup firmware and set as default
[C]: Configuration and information
[Q]: Quit menu and continue to boot with default firmware.
[H]: Display this list of options.
Enter G, F, Q, or H:
```

8. Type **G** to get the new firmware image from the TFTP server. The following message appears:

Enter TFTP server address [192.168.1.168]:

9. Type the address of the TFTP server and press **Enter**. The following message appears:

Enter Local Address [192.168.1.188]:

10. Type an IP address of the FortiGate unit to connect to the TFTP server. The IP address must be on the same network as the TFTP server.



Make sure you do not enter the IP address of another device on this network.

---

The following message appears:

Enter File Name [image.out]:

11. Enter the firmware image file name and press **Enter**. The TFTP server uploads the firmware image file to the FortiGate unit and the following appears.

Save as Default firmware/Backup firmware/Run image without saving: [D/B/R]

12. Type **R**. The FortiGate image is installed to system memory and the FortiGate unit starts running the new firmware image, but with its current configuration.

You can test the new firmware image as required. When done testing, you can reboot the FortiGate unit, and the FortiGate unit will resume using the firmware that was running before you installed the test firmware.

## Upgrading the firmware

Installing firmware replaces your current antivirus and attack definitions, along with the definitions included with the firmware release you are installing. After you install new firmware, make sure that antivirus and attack definitions are up to date. You can also use the CLI command `execute update-now` to update the antivirus and attack definitions. For more information, see the [System Administration](#) handbook.



Always remember to back up your configuration before making any changes to the firmware.

Be sure to read the topics on [downloading](#) and [testing](#) firmware before upgrading.

---

### To upgrade the firmware - GUI:

1. Log into the GUI as the admin administrative user.
2. Go to **System > Firmware**.
3. Under **Upload Firmware**, select **Browse** and locate the firmware image file.
4. Select **OK**.

The FortiGate unit uploads the firmware image file, upgrades to the new firmware version, restarts, and displays the FortiGate login. This process takes a few minutes.

### To upgrade the firmware - CLI:

Before you begin, ensure you have a TFTP server running and accessible to the FortiGate unit.

1. Make sure the TFTP server is running.
2. Copy the new firmware image file to the root directory of the TFTP server.



3. Log into the CLI.
4. Make sure the FortiGate unit can connect to the TFTP server. You can use the following command to ping the computer running the TFTP server. For example, if the IP address of the TFTP server is 192.168.1.168:

```
execute ping 192.168.1.168
```

5. Enter the following command to copy the firmware image from the TFTP server to the FortiGate unit:

```
execute restore image tftp <filename> <tftp_ipv4>
```

Where `<name_str>` is the name of the firmware image file and `<tftp_ipv4>` is the IP address of the TFTP server. For example, if the firmware image file name is `image.out` and the IP address of the TFTP server is 192.168.1.168, enter:

```
execute restore image tftp image.out 192.168.1.168
```

The FortiGate unit responds with the message:

```
This operation will replace the current firmware version!  
Do you want to continue? (y/n)
```

6. Type `y`. The FortiGate unit uploads the firmware image file, upgrades to the new firmware version, and restarts. This process takes a few minutes.
7. Reconnect to the CLI.
8. Update antivirus and attack definitions, by entering:

```
execute update-now
```

## Reverting to a previous firmware version

The following procedure reverts the FortiGate unit to its factory default configuration and deletes any configuration settings. If you are reverting to a previous FortiOS version, you might not be able to restore the previous configuration from the backup configuration file.



Always remember to back up your configuration before making any changes to the firmware.

### To revert to a previous firmware version - GUI:

1. Log into the GUI as the admin user.
2. Go to **System > Firmware**.
3. Under **Upload Firmware**, select **Browse** and locate the firmware image file.
4. Select **OK**.

The FortiGate unit uploads the firmware image file, reverts to the old firmware version, resets the configuration, restarts, and displays the FortiGate login. This process takes a few minutes.

### To revert to a previous firmware version - CLI:

Before beginning this procedure, it is recommended that you:

- Backup the FortiGate unit system configuration using the command `execute backup config`.
- Backup the IPS custom signatures using the command `execute`

```
backup ipsuserdefsig.
```

- Backup web content and email filtering lists.

To use the following procedure, you must have a TFTP server the FortiGate unit can connect to.

1. Make sure the TFTP server is running.
2. Copy the firmware image file to the root directory of the TFTP server.
3. Log into the FortiGate CLI.
4. Make sure the FortiGate unit can connect to the TFTP server by using the `execute ping` command.
5. Enter the following command to copy the firmware image from the TFTP server to the FortiGate unit:

```
execute restore image tftp <name_str> <tftp_ipv4>
```

Where `<name_str>` is the name of the firmware image file and `<tftp_ipv4>` is the IP address of the TFTP server. For example, if the firmware image file name is `imagev28.out` and the IP address of the TFTP server is `192.168.1.168`, enter:

```
execute restore image tftp image28.out 192.168.1.168
```

The FortiGate unit responds with this message:

```
This operation will replace the current firmware version!
Do you want to continue? (y/n)
```

6. Type `y`. The FortiGate unit uploads the firmware image file. After the file uploads, a message similar to the following appears:

```
Get image from tftp server OK.
Check image OK.
This operation will downgrade the current firmware version!
Do you want to continue? (y/n)
```

7. Type `y`. The FortiGate unit reverts to the old firmware version, resets the configuration to factory defaults, and restarts. This process takes a few minutes.
8. Reconnect to the CLI.
9. To restore your previous configuration, if needed, use the command:

```
execute restore config <name_str> <tftp_ipv4>
```

10. Update antivirus and attack definitions using the command:

```
execute update-now
```

## Installing firmware from a system reboot - CLI

In the event that the firmware upgrade does not load properly and the FortiGate unit will not boot, or continuously reboots, it is best to perform a fresh install of the firmware from a reboot using the CLI.

This procedure installs a firmware image and resets the FortiGate unit to default settings. You can use this procedure to upgrade to a new firmware version, revert to an older firmware version, or re-install the current firmware.

To use this procedure, you must connect to the CLI using the FortiGate console port and a RJ-45 to DB-9, or null modem cable. This procedure reverts the FortiGate unit to its factory default configuration.

For this procedure you install a TFTP server that you can connect to from the FortiGate internal interface. The TFTP server should be on the same subnet as the internal interface.

Before beginning this procedure, ensure you backup the FortiGate unit configuration.

If you are reverting to a previous FortiOS version, you might not be able to restore the previous configuration from the backup configuration file.

Installing firmware replaces your current antivirus and attack definitions, along with the definitions included with the firmware release you are installing. After you install new firmware, make sure that antivirus and attack definitions are up to date.

#### To install firmware from a system reboot:

1. Connect to the CLI using the RJ-45 to DB-9 or null modem cable.
2. Make sure the TFTP server is running.
3. Copy the new firmware image file to the root directory of the TFTP server.
4. Make sure the internal interface is connected to the same network as the TFTP server.
5. To confirm the FortiGate unit can connect to the TFTP server, use the following command to ping the computer running the TFTP server. For example, if the IP address of the TFTP server is 192.168.1.168:

```
execute ping 192.168.1.168
```

6. Enter the following command to restart the FortiGate unit.

```
execute reboot
```

The FortiGate unit responds with the following message:

```
This operation will reboot the system!  
Do you want to continue? (y/n)
```

7. Type **y**. As the FortiGate unit starts, a series of system startup messages appears. When the following messages appears:

```
Press any key to display configuration menu.....
```

Immediately press any key to interrupt the system startup.



You have only three (3) seconds to press any key. If you do not press a key quickly enough, the FortiGate unit reboots and you must log in and repeat the `execute reboot` command.

---

If you successfully interrupt the startup process, the following messages appears:

```
[G]: Get firmware image from TFTP server.  
[F]: Format boot device.  
[B]: Boot with backup firmware and set as default  
[C]: Configuration and information  
[Q]: Quit menu and continue to boot with default firmware.  
[H]: Display this list of options.  
Enter G, F, Q, or H:
```

8. Type **G** to get to the new firmware image form the TFTP server. The following message appears:

```
Enter TFTP server address [192.168.1.168]:
```

9. Type the address of the TFTP server and press **Enter**. The following message appears:

```
Enter Local Address [192.168.1.188]:
```

10. Type an IP address the FortiGate unit can use to connect to the TFTP server. The IP address can be any IP address that is valid for the network to which the interface is connected.



Make sure you do not enter the IP address of another device on this network.

The following message appears:

```
Enter File Name [image.out]:
```

11. Enter the firmware image filename and press **Enter**.

The TFTP server uploads the firmware image file to the FortiGate unit and a message similar to the following appears:

```
Save as Default firmware/Backup firmware/Run image without saving: [D/B/R]
```

12. Type **D**. The FortiGate unit installs the new firmware image and restarts. The installation might take a few minutes to complete.

## Restore from a USB key - CLI

1. Log into the CLI.
2. Enter the following command to restore an unencrypted configuration file:

```
exec restore image usb <filename>
```

If your configuration file was encrypted, enter the following command:

```
execute restore config usb-mode <password>
```

The FortiGate unit responds with the following message:

```
This operation will replace the current firmware version!
Do you want to continue? (y/n)
```

3. Type **y**.

## Controlled upgrade

Using a controlled upgrade, you can upload a new version of the FortiOS firmware to a separate partition in the FortiGate memory for later upgrade. The FortiGate unit can also be configured so that when it is rebooted, it will automatically load the new firmware (CLI only). Using this option, you can stage a number of FortiGate units to do an upgrade simultaneously to all devices using FortiManager or script.

### To load the firmware for later installation - CLI:

```
execute restore secondary-image {ftp | tftp | usb} <filename_str>
```

To set the FortiGate unit so that when it reboots, the new firmware is loaded, use the CLI command . . .

```
execute set-next-reboot {primary | secondary}
```

where {primary | secondary} is the partition with the preloaded firmware.

## Configuration Backups

Once you successfully configure the FortiGate, it is extremely important that you backup the configuration. In some cases, you may need to reset the FortiGate to factory defaults or perform a TFTP upload of the firmware, which will erase the existing configuration. In these instances, the configuration on the device will have to be recreated, unless a backup can be used to restore it. You should also backup the local certificates, as the unique SSL inspection CA and server certificates that are generated by your FortiGate by default are not saved in a system backup.

It is also recommended that you backup the configuration after *any* future changes are made, to ensure you have the most current configuration available. Also, backup the configuration before any upgrades of the FortiGate's firmware. Should anything happen to the configuration during the upgrade, you can easily restore the saved configuration.

Always backup the configuration and store it on the management computer or off-site. You have the option to save the configuration file to various locations including the local PC, USB key, FTP, and TFTP server. The last two are configurable through the CLI only.

If you have VDOMs, you can back up the configuration of the entire FortiGate or only a specific VDOM. Note that if you are using FortiManager or FortiCloud, full backups are performed and the option to backup individual VDOMs will not appear.

### Backing up the configuration using the GUI

1. Click on **admin** in the upper right-hand corner of the screen and select **Configuration > Backup**.
2. Direct the backup to your **Local PC** or to a **USB Disk**.  
The **USB Disk** option will be grayed out if no USB drive is inserted in the USB port. You can also backup to the FortiManager using the CLI.
3. If VDOMs are enabled, indicate whether the scope of the backup is for the entire FortiGate configuration (**Global**) or only a specific VDOM configuration (**VDOM**).
4. If backing up a VDOM configuration, select the VDOM name from the list.
5. Select **Encryption**.  
Encryption must be enabled on the backup file to back up VPN certificates.
6. Enter a password and enter it again to confirm it. You will need this password to restore the file.
7. Select **OK**.
8. The web browser will prompt you for a location to save the configuration file. The configuration file will have a .conf extension.

### Backing up the configuration using the CLI

Use one of the following commands:

```
execute backup config management-station <comment>
```

or:

```
execute backup config usb <backup_filename> [<backup_password>]
```

or for FTP, note that port number, username are optional depending on the FTP site:

```
execute backup config ftp <backup_filename> <ftp_server> [<port>] [<user_name>]  
[<password>]
```

or for TFTP:

```
execute backup config tftp <backup_filename> <tftp_servers> <password>
```

Use the same commands to backup a VDOM configuration by first entering the commands:

```
config vdom  
edit <vdom_name>
```

## Backup and restore the local certificates

This procedure exports a server (local) certificate and private key together as a password protected PKCS12 file. The export file is created through a customer-supplied TFTP server. Ensure that your TFTP server is running and accessible to the FortiGate before you enter the command.

### To back up the local certificates:

Connect to the CLI and use the following command:

```
execute vpn certificate local export tftp <cert_name> <filename> <tftp_ip>
```

where:

- <cert\_name> is the name of the server certificate.
- <filename> is a name for the output file.
- <tftp\_ip> is the IP address assigned to the TFTP server host interface.

### To restore the local certificates - GUI:

1. Move the output file from the TFTP server location to the management computer.
2. Go to **System > Certificates** and select **Import**.
3. Select the appropriate type of certificate from the dropdown menu and fill in any required fields.
4. Select **Upload**. Browse to the location on the management computer where the exported file has been saved, select the file and select **Open**.
5. If required, enter the **Password** needed to upload the exported file.
6. Select **OK**.

### To restore the local certificates - CLI:

Connect to the CLI and use the following command:

```
execute vpn certificate local import tftp <filename> <tftp_ip>
```

## Backup and restore a configuration file using SCP

You can use secure copy protocol (SCP) to download the configuration file from the FortiGate as an alternative method of backing up the configuration file or an individual VDOM configuration file. This is done by enabling SCP for an administrator account and enabling SSH on a port used by the SCP client application to connect to the FortiGate. SCP is enabled using the CLI commands:

```
config system global
```

```
set admin-scp enable
end
```

Use the same commands to backup a VDOM configuration by first entering the commands:

```
config global
set admin-scp enable
end
config vdom
edit <vdom_name>
```

## Enable SSH access on the interface

SCP uses the SSH protocol to provide secure file transfer. The interface you use for administration must allow SSH access.

### To enable SSH - GUI:

1. Go to **Network > Interfaces**.
2. Select the interface you use for administrative access and select **Edit**.
3. In the **Administrative Access** section, select **SSH**.
4. Select **OK**.

### To enable SSH - CLI:

```
config system interface
edit <interface_name>
set allowaccess ping https ssh
end
```



When adding to, or removing a protocol, you must type the entire list again. For example, if you have an access list of HTTPS and SSH, and you want to add PING, typing:

```
set allowaccess ping
```

will only set PING. To add all three, you must type:

```
set allowaccess https ssh ping
```

## Using the SCP client

The FortiGate downloads the configuration file as `sys_conf`. Use the following syntax to download the file:

### Linux

```
scp admin@<FortiGate_IP>:fgt-config <location>
```

### Windows

```
pscp admin@<FortiGate_IP>:fgt-config <location>
```

The following examples show how to download the configuration file from a FortiGate-100D, at IP address 172.20.120.171, using Linux and Windows SCP clients.

### Linux client example

To download the configuration file to a local directory called `~/config`, enter the following command:

```
scp admin@172.20.120.171:fgt-config ~/config
```

Enter the admin password when prompted.

### Windows client example

To download the configuration file to a local directory called `c:\config`, enter the following command in a Command Prompt window:

```
pscp admin@172.20.120.171:fgt-config c:\config
```

Enter the admin password when prompted.

## SCP public-private key authentication

SCP authenticates itself to the FortiGate in the same way as an administrator using SSH accesses the CLI. Instead of using a password, you can configure the SCP client and the FortiGate with a public-private key pair.

### To configure public-private key authentication:

1. Create a public-private key pair using a key generator compatible with your SCP client.
2. Save the private key to the location on your computer where your SSH keys are stored.  
This step depends on your SCP client. The Secure Shell key generator automatically stores the private key.

3. Copy the public key to the FortiGate using the CLI commands:

```
config system admin
  edit admin
    set ssh-public-key1 "<key-type> <key-value>"
  end
```

`<key-type>` must be the `ssh-dss` for a DSA key or `ssh-rsa` for an RSA key. For the `<key-value>`, copy the public key data and paste it into the CLI command.

If you are copying the key data from Windows Notepad, copy one line at a time and ensure that you paste each line of key data at the end of the previously pasted data. Also:

- Do not copy the end-of-line characters that appear as small rectangles in Notepad.
- Do not copy the `----- BEGIN SSH2 PUBLIC KEY -----` or `Comment: "[2048-bit dsa,...]"` lines.
- Do not copy the `----- END SSH2 PUBLIC KEY -----` line.

4. Type the closing quotation mark and press **Enter**.

Your SCP client can now authenticate to the FortiGate based on SSH keys rather than the administrator password.

## Restoring a configuration using SCP

To restore the configuration using SCP, use the commands:

```
scp <local_file> <admin_user>@<FGT_IP>:fgt_restore_config
```



To use this command/method of restoring the FortiGate configuration, you need to log in as the “admin” administrator.

## Restoring a configuration

Should you need to restore a configuration file, use the following steps:

### To restore the FortiGate configuration - GUI:

1. Click on **admin** in the upper right-hand corner of the screen and select **Configuration > Restore**.
2. Identify the source of the configuration file to be restored : your **Local PC** or a **USB Disk**.  
The **USB Disk** option will be grayed out if no USB drive is inserted in the USB port. You can restore from the FortiManager using the CLI.
3. Enter the path and file name of the configuration file, or select **Browse** to locate the file.
4. Enter a password if required.
5. Select **Restore**.

### To back up the FortiGate configuration - CLI:

```
execute restore config management-station normal 0
```

or:

```
execute restore config usb <filename> [<password>]
```

or for FTP, note that port number, username are optional depending on the FTP site:

```
execute backup config ftp <backup_filename> <ftp_server> [<port>] [<user_name>] [<password>]
```

or for TFTP:

```
execute backup config tftp <backup_filename> <tftp_server> <password>
```

The FortiGate will load the configuration file and restart. Once the restart has completed, verify that the configuration has been restored.

## Configuration revision

You can manage multiple versions of configuration files on models that have a 512MB flash memory and higher. Revision control requires either a configured central management server or the local hard drive, if your FortiGate has this feature. Typically, configuration backup to local drive is not available on lower-end models.

The central management server can either be a FortiManager unit or FortiCloud.

If central management is not configured on your FortiGate unit, a message appears instructing you to either:

- Enable central management, **or**
- obtain a valid license.

When revision control is enabled on your FortiGate unit, and configuration backups have been made, a list of saved revisions of those backed-up configurations appears.

Configuration revisions are viewed by clicking on **admin** in the upper right-hand corner of the screen and selecting **Configuration > Revisions**.

## Restore factory defaults

There may be a need to reset the FortiGate to its original defaults; for example, to begin with a fresh configuration. There are two options when restoring factory defaults. The first resets the entire device to the original out-of-the-box configuration.

You can reset using the CLI by entering the command:

```
execute factoryreset
```

When prompted, type `y` to confirm the reset.

Alternatively, in the CLI you can reset the factory defaults but retain the interface and VDOM configuration. Use the following command:

```
execute factoryreset2
```

## FortiGuard

The FortiGuard Distribution Network (FDN) of servers provides updates to antivirus, antispam, and IPS definitions to your FortiGate. FortiGuard Subscription Services provides comprehensive Unified Threat Management (UTM) security solutions to enable protection against content and network level threats.

The FortiGuard team can be found around the globe, monitoring virus, spyware and vulnerability activities. As vulnerabilities are found, signatures are created and pushed to the subscribed FortiGates. The Global Threat Research Team enables Fortinet to deliver a combination of multi-layered security intelligence and provide true zero-day protection from new and emerging threats. The FortiGuard Network has data centers around the world located in secure, high availability locations that automatically deliver updates to the Fortinet security platforms to protect the network with the latest information.

FortiGuard provides a number of services to monitor world-wide activity and provide the best possible security, including:

- **Intrusion Prevention System (IPS)** - IPS uses a customizable database of more than 4000 known threats to stop attacks that evade conventional firewall defenses. It also provides behavior-based heuristics, enabling the system to recognize threats when no signature has yet been developed. It also provides more than 1000 application identity signatures for complete application control.
- **Application Control** - Application Control allows you to identify and control applications on networks and endpoints regardless of port, protocol, and IP address used. It gives you unmatched visibility and control over application traffic, even traffic from unknown applications and sources. Application Control is a free FortiGuard service and the database for Application Control signatures is separate from the IPS database (Botnet Application signatures are still part of the IPS signature database since these are more closely related with security issues and less about application detection). Application Control signature database information is displayed under the **System > FortiGuard** page in the FortiCare section.



Please note that while the Application Control profile can be used for free, signature database updates require a valid FortiGuard subscription.

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- **AntiVirus** - The FortiGuard AntiVirus Service provides fully automated updates to ensure protection against the latest content level threats. It employs advanced virus, spyware, and heuristic detection engines to prevent both new and evolving threats from gaining access to your network and protects against vulnerabilities.
- **Web Filtering** - Web Filtering provides Web URL filtering to block access to harmful, inappropriate, and dangerous web sites that may contain phishing/pharming attacks, malware such as spyware, or objectionable content that can expose your organization to legal liability. Based on automatic research tools and targeted research analysis, real-time updates enable you to apply highly-granular policies that filter web access based on six major categories and nearly 80 micro-categories, over 45 million rated web sites, and more than two billion web pages - all continuously updated.
- **Email Filtering** - The FortiGuard Antispam Service uses both a sender IP reputation database and a spam signature database, along with sophisticated spam filtering tools on Fortinet appliances and agents, to detect and block a wide range of spam messages. Updates to the IP reputation and spam signature databases are provided continuously via the FDN.
- **Messaging Services** - Messaging Services allow a secure email server to be automatically enabled on your FortiGate to send alert email or send email authentication tokens. With the SMS gateway, you can enter phone

numbers where the FortiGate will send the SMS messages. Note that depending on your carrier, there may be a slight time delay on receiving messages.

- **DNS and DDNS** - The FortiGuard DNS and DDNS services provide an efficient method of DNS lookups once subscribed to the FortiGuard network. This is the default option. The FortiGate connects automatically to the FortiGuard DNS server. If you do not register, you need to configure an alternate DNS server.

Configure the DDNS server settings using the CLI command:

```
config system fortiguard
    set ddns-server-ip
    set ddns-server-port
end
```

## Support Contract and FortiGuard Subscription Services

The FDN support **Contract** is available under **System > FortiGuard**.

The License Information area displays the status of your FortiGate's support contract.

You can also manually update the AntiVirus and IPS engines.

## Verifying your connection to FortiGuard

If you are not getting FortiGuard web filtering or antispam services, there are a few things to verify that communication to the FDN is working. Before any troubleshooting, ensure that the FortiGate has been registered and subscribed to the FortiGuard services.

### Verification - GUI:

The simplest method to check that the FortiGate is communicating with the FDN, is to check the **License Information** dashboard widget. Any subscribed services should have a green check mark beside them indicating that connections are successful. Any other icon indicates a problem with the connection, or you are not subscribed to the FortiGuard services.

You can also view the FortiGuard connection status by going to **System > FortiGuard**.

### Verification - CLI:

You can also use the CLI to see what FortiGuard servers are available to your FortiGate. Use the following CLI command to ping the FDN for a connection:

```
execute ping guard.fortinet.net
```

You can also use the following diagnose command to find out what FortiGuard servers are available:

```
diagnose debug rating
```

From this command, you will see output similar to the following:

```
Locale : english
License : Contract
Expiration : Sun Jul 24 20:00:00 2011
Hostname : service.fortiguard.net
== Server List (Tue Nov 2 11:12:28 2010) ==

IP Weight      RTT  Flags  TZ   Packets  Curr Lost  Total Lost
69.20.236.180  0    10     -5   77200 0         42
69.20.236.179  0    12     -5   52514 0         34
```

66.117.56.42	0	32	-5	34390	0	62
80.85.69.38	50	164	0	34430	0	11763
208.91.112.194	81	223	D -8	42530	0	8129
216.156.209.26	286	241	DI -8	55602	0	21555

An extensive list of servers are available. Should you see a list of three to five available servers, the FortiGuard servers are responding to DNS replies to service FortiGuard.net, but the INIT requests are not reaching FDS services on the servers.

The rating flags indicate the server status:

<b>D</b>	Indicates the server was found via the DNS lookup of the hostname. If the hostname returns more than one IP address, all of them will be flagged with 'D' and will be used first for INIT requests before falling back to the other servers.
<b>I</b>	Indicates the server to which the last INIT request was sent.
<b>F</b>	The server has not responded to requests and is considered to have failed.
<b>T</b>	The server is currently being timed.

The server list is sorted first by weight and then the server with the smallest RTT is put at the top of the list, regardless of weight. When a packet is lost, it will be resent to the next server in the list.

The weight for each server increases with failed packets and decreases with successful packets. To lower the possibility of using a distant server, the weight is not allowed to dip below a base weight, which is calculated as the difference in hours between the FortiGate and the server, multiplied by 10. The further away the server, the higher its base weight and the lower in the list it will appear.

## Port assignment

The FortiGate contacts FDN for the latest list of FDN servers by sending UDP packets with typical source ports of 1027 or 1031, and destination port 8888. The FDN reply packets have a destination port of 1027 or 1031.

If your ISP blocks UDP packets in this port range, the FortiGate cannot receive the FDN reply packets. As a result, the FortiGate will not receive the complete FDN server list.

If your ISP blocks the lower range of UDP ports (around 1024), you can configure your FortiGate to use higher-numbered ports, using the CLI command:

```
config system global
    set ip-src-port-range <start port>-<end port>
end
```

where the <start port> and <end port> are numbers ranging of 1024 to 25000.

For example, you could configure the FortiGate to not use ports lower than 2048 or ports higher than the following range:

```
config system global
    set ip-src-port-range 2048-20000
end
```

Trial and error may be required to select the best source port range. You can also contact your ISP to determine the best range to use. Push updates might be unavailable if:

- there is a NAT device installed between the unit and the FDN, and/or
- your unit connects to the Internet using a proxy server.

## Configuring AntiVirus and IPS Options

Go to **System > FortiGuard**, and scroll down to the **AntiVirus & IPS Updates** section to configure the antivirus and IPS options for connecting and downloading definition files.

<b>Accept push updates</b>	Select to allow updates to be sent automatically to your FortiGate. New definitions will be added as soon as they are released by FortiGuard.
<b>Use override push</b>	<p>Appears only if <b>Accept push updates</b> is enabled.</p> <p>Enable to configure an override server if you cannot connect to the FDN or if your organization provides updates using their own FortiGuard server. Once enabled, enter the following:</p> <ul style="list-style-type: none"> <li>• Enter the IP address and port of the NAT device in front of your FortiGate. FDS will connect to this device when attempting to reach the FortiGate.</li> <li>• The NAT device must be configured to forward the FDS traffic to the FortiGate on UDP port 9443.</li> </ul>
<b>Scheduled Updates</b>	<p>Enable for updates to be sent to your FortiGate at a specific time. For example, to minimize traffic lag times, you can schedule the update to occur on weekends or after work hours.</p> <p>Note that a schedule of once a week means any urgent updates will not be pushed until the scheduled time. However, if there is an urgent update required, select the <b>Update Now</b> button.</p>
<b>Improve IPS quality</b>	Enable to help Fortinet maintain and improve IPS signatures. The information sent to the FortiGuard servers when an attack occurs can be used to keep the database current as variants of attacks evolve.
<b>Use extended IPS signature package</b>	Regular IPS database protects against the latest common and in-the-wild attacks. Extended IPS database includes protection from legacy attacks.
<b>Update AV &amp; IPS Definitions</b>	Select to manually initiate an FDN update.

## Manual updates

To manually update the signature definitions file, you need to first go to the Support web site at <https://support.fortinet.com>. Once logged in, select **Download > FortiGuard Service Updates**. The browser will present you the most current IPS and AntiVirus signature definitions which you can download.

Once downloaded to your computer, log into the FortiGate to load the definition file.

**To load the definition file onto the FortiGate:**

1. Go to **System > FortiGuard**.
2. In the **License Information** table, select the **Upgrade Database** link in either the **Application Control Signature**, **IPS**, or **AntiVirus** row.
3. In the pop-up window, select **Upload** and locate the downloaded file and select **Open**.  
The upload may take a few minutes to complete.

## Automatic updates

The FortiGate can be configured to request updates from FDN on a scheduled basis, or via push notification.

### Scheduling updates

Scheduling updates ensures that the virus and IPS definitions are downloaded to your FortiGate on a regular basis, ensuring that you do not forget to check for the definition files yourself.

Updating definitions can cause a very short disruption in traffic currently being scanned while the FortiGate unit applies the new signature database. Ideally, schedule updates during off-peak hours, such as evenings or weekends, when network usage is minimal, to ensure that the network activity will not suffer from the added traffic of downloading the definition files.

**To enable scheduled updates - GUI:**

1. Go to **System > FortiGuard** and scroll down to **AntiVirus & IPS Updates**.
2. Enable **Scheduled Updates**.
3. Select the frequency of updates.
4. Select **Apply**.

**To enable scheduled updates - CLI:**

```
config system autoupdate schedule
  set status enable
  set frequency {every | daily | weekly}
  set time <hh:mm>
  set day <day_of_week>
end
```

### Push updates

Push updates enable you to get immediate updates when new viruses or intrusions have been discovered and new signatures created. This ensures that the latest signature will be sent to the FortiGate as soon as possible.

When a push notification occurs, the FortiGuard server sends a notice to the FortiGate that there is a new signature definition file available. The FortiGate then initiates a download of the definition file, similar to the scheduled update.

To ensure maximum security for your network, you should have a scheduled update as well as enable the push update, in case an urgent signature is created, and your cycle of the updates only occurs weekly.

**To enable push updates - GUI:**

1. Go to **System > FortiGuard** and scroll down to **AntiVirus & IPS Updates**.
2. Enable **Accept push updates**.
3. Select **Apply**.

**To enable push updates - CLI:**

```
config system autoupdate push-update
    set status enable
end
```

**Push IP override**

If the FortiGate is behind another NAT device (or another FortiGate), to ensure it receives the push update notifications, you need to use an override IP address for the notifications. To do this, you create a virtual IP to map to the external port of the NAT device.

Generally speaking, if there are two FortiGate devices, the following steps need to be completed on the FortiGate NAT device to ensure the FortiGate on the internal network receives the updates:

- Add a port forwarding virtual IP to the FortiGate NAT device that connects to the Internet by going to **Policy & Objects > Virtual IPs**.
- Add a security policy to the FortiGate NAT device that connects to the Internet that includes the port forwarding virtual IP.
- Configure the FortiGate on the internal network with an override push IP and port.

On the FortiGate internal device, the virtual IP is entered as the **Use push override** IP address.

**To enable push update override- GUI:**

1. Go to **System > FortiGuard** and scroll down to **AntiVirus & IPS Updates**.
2. Enable **Accept push updates**.
3. Enable **Use override push**.
4. Enter the virtual IP address configured on the NAT device.
5. Select **Apply**.

**To enable push updates - CLI:**

```
config system autoupdate push-update
    set status enable
    set override enable
    set address <vip_address>
end
```

**Sending malware statistics to FortiGuard**

To support following malware trends and making zero-day discoveries, FortiGate units send encrypted statistics to FortiGuard about IPS, Application Control, and AntiVirus events detected by the FortiGuard services running on your FortiGate. FortiGuard uses the statistics collected to achieve a balance between performance and security effectiveness by moving inactive signatures to an extended signature database.



The statistics include some non-personal information that identifies your FortiGate and its country. The information is never shared with external parties. You can choose to disable the sharing of this information by entering the following CLI command:

```
config system global
    set fds-statistics disable
end
```

## Configuring Web Filtering and email filtering options

Go to **System > FortiGuard**, and scroll down to **Filtering** to set the size of the caches and ports.

<b>Web Filter Cache</b>	Set the Time To Live (TTL) value. This is the number of seconds the FortiGate will store a blocked IP or URL locally, saving time and network access traffic, checking the FortiGuard server. Once the TTL has expired, the FortiGate will contact an FDN server to verify a web address. The TTL must be between 300 and 86400 seconds.
<b>Anti-Spam Cache</b>	Set the TTL value (see above).
<b>FortiGuard Filtering Port</b>	Select the port assignments for contacting the FortiGuard servers.
<b>Filtering Service Availability</b>	Indicates the status of the filtering service. Select <b>Check Again</b> if the filtering service is not available.
<b>Request re-evaluation of a URL's category</b>	Select to re-evaluate a URL's category rating on the FortiGuard Web Filter service.

## Email filtering

The FortiGuard data centers monitor and update email databases of known spam sources. With FortiGuard Anti-Spam filtering enabled, the FortiGate verifies incoming email sender addresses and IPs against the database, and takes the necessary actions as defined within the antivirus profiles.

Spam source IP addresses can also be cached locally on the FortiGate, providing a quicker response time, while easing load on the FortiGuard servers, aiding in a quicker response time for less common email address requests.

By default, the anti-spam cache is enabled. The cache includes a TTL value, which is the amount of time an email address will stay in the cache before expiring. You can change this value to shorten or extend the time between 5 and 1,440 minutes.

### To modify the antispam cache TTL - GUI:

1. Go to **System > FortiGuard**.
2. Under **Filtering**, enable **Anti-Spam Cache**.
3. Enter the TTL value in minutes.
4. Select **Apply**.

### To modify the Anti-Spam filter TTL - CLI:

```
config system fortiguard
```

```
set antispam-cache-ttl <integer>
end
```

Further antispam filtering options can be configured to block, allow, or quarantine specific email addresses. These configurations are available through the **Security Profiles > Anti-Spam** menu. For more information, see the [Security Profiles](#) handbook chapter.

## Online security tools

The FortiGuard online center provides a number of online security tools, including but not limited to:

- **URL lookup** — By entering a website address, you can see if it has been rated and what category and classification it is filed as. If you find your website or a site you commonly go to has been wrongly categorized, you can use this page to request that the site be re-evaluated.  
<https://fortiguard.com/webfilter>
- **Threat Encyclopedia** — Browse the FortiGuard Labs extensive encyclopedia of threats. Search for viruses, botnet C&C, IPS, endpoint vulnerabilities, and mobile malware.  
<https://www.fortiguard.com/encyclopedia>
- **Application Control** — Browse the FortiGuard Labs extensive encyclopedia of applications.  
<https://fortiguard.com/appcontrol>

## FortiCloud

FortiCloud is a hosted security management and log retention service for FortiGate devices. It gives you centralized reporting, traffic analysis, configuration management, and log retention without the need for additional hardware or software.

FortiCloud offers a wide range of features:

- **Simplified central management** — FortiCloud provides a central web-based management console to manage individual or aggregated FortiGate and FortiWiFi devices. Adding a device to the FortiCloud management subscription is straightforward. FortiCloud has detailed traffic and application visibility across the whole network.
- **Hosted log retention with large default storage allocated** — Log retention is an integral part of any security and compliance program but administering a separate storage system is burdensome. FortiCloud takes care of this automatically and stores the valuable log information in the cloud. Each device is allowed up to 200GB of log retention storage. Different types of logs can be stored including Traffic, System Events, Web, Applications, and Security Events.
- **Monitoring and alerting in real time** — Network availability is critical to a good end-user experience. FortiCloud enables you to monitor your FortiGate network in real time with different alerting mechanisms to pinpoint potential issues. Alerting mechanisms can be delivered via email.
- **Customized or pre-configured reporting and analysis tools** — Reporting and analysis are your eyes and ears into your network's health and security. Pre-configured reports are available, as well as custom reports that can be tailored to your specific reporting and compliance requirements. For example, you may want to look closely at application usage or website violations. The reports can be emailed as PDFs and can cover different time periods.
- **Maintain important configuration information uniformly** — The correct configuration of the devices within your network is essential to maintaining an optimum performance and security posture. In addition, maintaining the correct firmware (operating system) level allows you to take advantage of the latest features.
- **Service security** — All communication (including log information) between the devices and the clouds is encrypted. Redundant data centers are always used to give the service high availability. Operational security measures have been put in place to make sure your data is secure — only you can view or retrieve it.

## Registration and Activation



Before you can activate a FortiCloud account, you must first register your device.

FortiCloud accounts can be registered manually through the FortiCloud website, <https://www.forticloud.com>, but you can easily register and activate your account directly from your FortiGate.

### Activating your FortiCloud Account

1. On your device's dashboard, in the **FortiCloud** widget, select the **Activate** button in the status field.
2. A dialogue asking you to register your FortiCloud account appears. Select **Create Account**, enter your information, view and accept the terms and conditions, and select **OK**.

3. A second dialogue window appears, asking you to enter your information to confirm your account. This sends a confirmation email to your registered email. The dashboard widget then updates to show that confirmation is required.
4. Open your email, and follow the confirmation link it contains.

## Results

A FortiCloud page will open, stating that your account has been confirmed. The Activation Pending message on the dashboard will change to state the type of account you have ('1GB Free' or '200GB Subscription'), and will provide a link to the FortiCloud portal.

## Enabling logging to FortiCloud

1. Go to **Log & Report > Log Settings**.
2. Enable **Send Logs to FortiCloud**.
3. Select **Test Connectivity** to ensure that your FortiGate can connect to the registered FortiCloud account.
4. Scroll down to **GUI Preferences**, set **Display Logs/FortiView From**, to see FortiCloud logs within the FortiGate's GUI.

## Logging into the FortiCloud portal

Once logging has been configured and you have registered your account, you can log into the FortiCloud portal and begin viewing your logging results. There are two methods to reach the FortiCloud portal:

- If you have direct networked access to the FortiGate, you can simply open your **Dashboard** and check the **License Information** widget. Next to the current FortiCloud connection status will be a link to reach the FortiCloud Portal.
- If you do not currently have access to the FortiGate's interface, you can visit the FortiCloud website (<https://forticloud.com>) and log in remotely, using your email and password. It will ask you to confirm the FortiCloud account you are connecting to and then you will be granted access. Connected devices can be remotely configured using the Scripts page in the Management Tab, useful if an administrator may be away from the unit for a long period of time.

## Cloud Sandboxing

FortiCloud can be used for automated sample tracking, or sandboxing, for files from a FortiGate. This allows suspicious files to be sent to be inspected without risking network security. If the file exhibits risky behavior, or is found to contain a virus, a new virus signature is created and added to the FortiGuard antivirus signature database.

Cloud sandboxing is configured by going to **Security Fabric > Settings**. After enabling **Sandbox Inspection**, select the **FortiSandbox type**.

Sandboxing results are shown in a new tab called **AV Submissions** in the FortiCloud portal. This tab only appears after a file has been sent for sandboxing.

For more information about FortiCloud, see the [FortiCloud documentation](#).

# Troubleshooting your FortiGate Installation

If your FortiGate does not function as desired after installation, try the following troubleshooting tips:

## 1. Check for equipment issues

Verify that all network equipment is powered on and operating as expected. Refer to the QuickStart Guide for information about connecting your FortiGate to the network. You will also find detailed information about the FortiGate LED indicators.

The FortiGate has multiple LED lights on the faceplate. Check the [FortiGate LED Specifications](#) guide to verify if the lights indicate any problems with your FortiGate itself or with connections between your FortiGate and other devices.

## 2. Check the physical network connections

Check the cables used for all physical connections to ensure that they are fully connected and do not appear damaged, and make sure that each cable connects to the correct device and the correct Ethernet port on that device.

## 3. Verify that you can connect to the internal IP address of the FortiGate

Connect to the GUI from the FortiGate's internal interface by browsing to its IP address. From the PC, try to ping the internal interface IP address; for example, `ping 192.168.1.99`.

If you cannot connect to the internal interface, verify the IP configuration of the PC. If you can ping the interface but can't connect to the GUI, check the settings for administrative access on that interface. Alternatively, use SSH to connect to the CLI, and then confirm that HTTPS has been enabled for Administrative Access on the interface.

## 4. Check the FortiGate interface configurations

Check the configuration of the FortiGate interface connected to the internal network (under **Network > Interfaces**) and check that **Addressing mode** is set to the correct mode.

## 5. Verify the security policy configuration

Go to **Policy & Objects > IPv4 Policy** and verify that the internal interface to Internet-facing interface security policy has been added and is located near the top of the policy list. Check the **Active Sessions** column to ensure that traffic has been processed (if this column does not appear, right-click on the table header and select **Active Sessions**).

If you are using NAT/Route mode, check the configuration of the policy to make sure that **NAT** is enabled and that **Use Outgoing Interface Address** is selected.

## 6. Verify the static routing configuration

Go to **Network > Static Routes** and verify that the default route is correct. Go to **Monitor > Routing Monitor** and verify that the default route appears in the list as a static route. Along with the default route, you should see two routes shown as **Connected**, one for each connected FortiGate interface.

## 7. Verify that you can connect to the Internet-facing interface's IP address

Ping the IP address of the Internet-facing interface of your FortiGate. If you cannot connect to the interface, the FortiGate is not allowing sessions from the internal interface to Internet-facing interface. Verify that PING has been enabled for **Administrative Access** on the interface.

## 8. Verify that you can connect to the gateway provided by your ISP

Ping the default gateway IP address from a PC on the internal network. If you cannot reach the gateway, contact your ISP to verify that you are using the correct gateway.

## 9. Verify that you can communicate from the FortiGate to the Internet

Access the FortiGate CLI and use the command `execute ping 8.8.8.8`. You can also use the `execute traceroute 8.8.8.8` command to troubleshoot connectivity to the Internet.

## 10. Verify the DNS configurations of the FortiGate and the PCs

Check for DNS errors by pinging or using traceroute to connect to a domain name; for example: `ping`

`www.fortinet.com`.

If the name cannot be resolved, the FortiGate or PC cannot connect to a DNS server and you should confirm that the DNS server IP addresses are present and correct.

#### 11. Confirm that the FortiGate can connect to the FortiGuard network

Once the FortiGate is on your network, you should confirm that it can reach the FortiGuard network.

First, check the **License Information** widget to make sure that the status of all FortiGuard services matches the services that you have purchased.

Go to **System > FortiGuard**. Scroll down to **Filtering Services Availability** and select **Check Again**. After a minute, the GUI should indicate a successful connection.

Verify that your FortiGate can resolve and reach FortiGuard at *service.fortiguard.net* by pinging the domain name. If you can reach this service, you can then verify the connection to FortiGuard servers by running the command `diagnose debug rating`. This displays a list of FortiGuard IP gateways you can connect to, as well as the following information:

- **Weight:** Based on the difference in time zone between the FortiGate and this server
- **RTT:** Return trip time
- **Flags:** D (IP returned from DNS), I (Contract server contacted), T (being timed), F (failed)
- **TZ:** Server time zone
- **Curr Lost:** Current number of consecutive lost packets
- **Total Lost:** Total number of lost packets

#### 12. Consider changing the MAC address of your external interface

Some ISPs do not want the MAC address of the device connecting to their network cable to change. If you have added a FortiGate to your network, you may have to change the MAC address of the Internet-facing interface using the following CLI command:

```
config system interface
  edit <interface>
    set macaddr <xx:xx:xx:xx:xx:xx>
  end
end
```

#### 13. Check the FortiGate bridge table (transparent mode)

When a FortiGate is in transparent mode, the unit acts like a bridge sending all incoming traffic out on the other interfaces. The bridge is between interfaces on the FortiGate unit. Each bridge listed is a link between interfaces. Where traffic is flowing between interfaces, you expect to find bridges listed. If you are having connectivity issues and there are no bridges listed, that is a likely cause. Check for the MAC address of the interface or device in question.

To list the existing bridge instances on the FortiGate, use the following CLI command:

```
diagnose netlink brctl name host root.b
show bridge control interface root.b host.
fdb: size=2048, used=25, num=25, depth=1
Bridge root.b host table
port no device devname mac addr ttl attributes
3 4 wan1 00:09:0f:cb:c2:77 88
3 4 wan1 00:26:2d:24:b7:d3 0
3 4 wan1 00:13:72:38:72:21 98
4 3 internal 00:1a:a0:2f:bc:c6 6
1 6 dmz 00:09:0f:dc:90:69 0 Local Static
3 4 wan1 c4:2c:03:0d:3a:38 81
3 4 wan1 00:09:0f:15:05:46 89
3 4 wan1 c4:2c:03:1d:1b:10 0
2 5 wan2 00:09:0f:dc:90:68 0 Local Static
```

#### 14. Use FortiExplorer if you can't connect to the FortiGate over Ethernet

If you can't connect to the FortiGate GUI or CLI, you may be able to connect using FortiExplorer. Refer to the

QuickStart Guide or see the section on [FortiExplorer](#) for more details.

**15. Either reset the FortiGate to factory defaults or contact Fortinet Support for assistance**

To reset the FortiGate to factory defaults, use the CLI command `execute factoryreset`. When prompted, type `y` to confirm the reset.

You can also contact Fortinet Support for assistance. Read the following article found on the Fortinet Cookbook website: [How to work with Fortinet Support](#) to understand what type of support is available and to determine which level of support is right for you. For further assistance, visit the [Fortinet Support](#) website.

# Resources

Here's a list of some resources you can check out next to help you get the most out of your newly installed and configured FortiGate.

## Best Practices

The Best Practices document is a collection of guidelines to ensure the most secure and reliable operation of FortiGates in a customer environment. It is updated periodically as new issues are identified.

This document can be found at <https://docs.fortinet.com/>.

## The Fortinet Cookbook

The Fortinet Cookbook contains a variety of step-by-step examples of how to integrate a FortiGate into your network and apply features such as security profiles, wireless networking, and VPN.

Using the Cookbook, you can go from idea to execution in simple steps, configuring a secure network for better productivity with reduced risk.

The Fortinet Cookbook can be found at <http://cookbook.fortinet.com>.

## The Fortinet Video Library

The Fortinet Video Library contains video tutorials showing how to configure various Fortinet products, including FortiGates. Many FortiGate videos are based on recipes from the FortiGate Cookbook.

The Fortinet Video Library can be found at <https://video.fortinet.com>. You can also [subscribe to Fortinet's YouTube channel](#).

## The FortiOS Handbook

The FortiOS Handbook is the complete guide to FortiOS, covering a variety of FortiGate configurations. The Handbook is available as a single complete document online. Handbook chapters are also available as standalone documents.

The FortiOS Handbook can be found at <https://docs.fortinet.com/>.



## Fortinet Support

You can also contact Fortinet Support for assistance. Read the following article found on the Fortinet Cookbook website: [How to work with Fortinet Support](#) to understand what type of support is available and to determine which level of support is right for you. For further information, go to <https://support.fortinet.com>.



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